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Rubber Growers' Assoc

THE
BULLETIN
OF THE
Rubber Growers' Association
(Incorporated.)

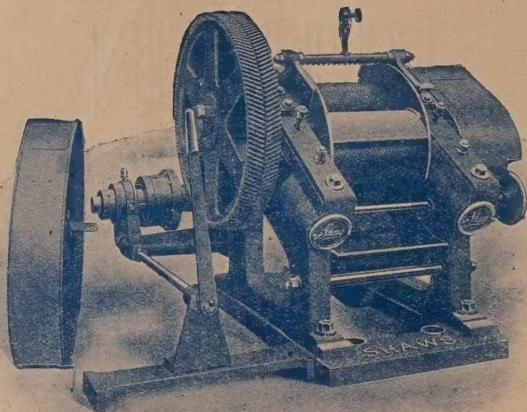


Vol. 6. No. 11.

Nov., 1924.

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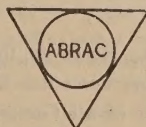
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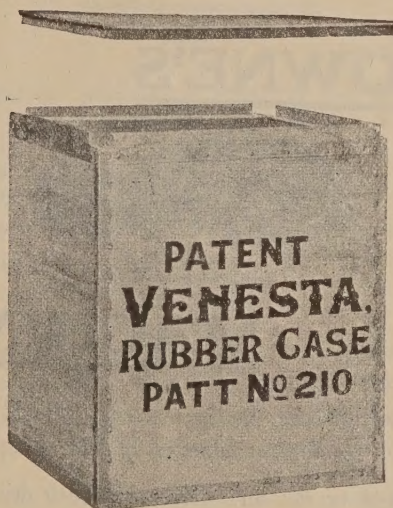
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The Policy of the Government of the Federated Malay States in regard to Anti - Malaria measures is as follows:—

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- (ii) In all Railway Reserves, the proper and reasonable burden lies upon the Railway Department, and in respect of all Government Reserves and State lands, the proper and reasonable burden lies upon the Mosquito Destruction Board.
- (iii) In order that anti-malaria measures may be effectual there should be co-operation of proprietors of contiguous estates amongst themselves, and with the Mosquito Destruction Board and the Health Officers.

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PAMPHLETS AND BOOKS ON RUBBER.

The following publications, issued by the Rubber Growers' Association, may be obtained on application :—

Preparation of Plantation Rubber, containing recommendations for the curing of latex and treatment of crepe and sheet rubber, articles on preparation of rubber, factory practice, and packing. (60 pp. 8vo.) Published, May, 1917.

Free of charge.

Recommendations for the curing of latex and treatment of crepe and sheet rubber, compiled by the Uniformity Committee :—

Printed on two cloth sheets (one for crepe and one for sheet), 6d. per set, to cover packing and postage.

Brown Bast.—An investigation into its causes and methods of treatment, by A. R. Sanderson, F.L.S., and H. Sutcliffe, A.R.C.S. (Royal 8vo, 71 pp., 26 plates).

Free of charge.

The Preservation and Shipment of Latex (22 pp., Royal 8vo).

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THE BULLETIN

OF THE

RUBBER GROWERS' ASSOCIATION

(INCORPORATED).

Vol. 6.

NOVEMBER, 1924.

No. 11.

COUNCIL.

A meeting of the Council was held on the 3rd November, 1924, the following being the important business transacted:—

Membership of Council.

Mr. A. J. Denison was elected Member of Council to fill the vacancy caused by the resignation of Sir John Anderson.

Export Restriction Legislation—Malaya.

Cablegram from the Association's Local Secretary, Kuala Lumpur, containing details of the standard production for 1923-24 was noted.

Poplar Hospital for Accidents.

It was agreed that the usual facilities should be extended to this Hospital for the circulation of a suitable appeal to Company members (see page 690).

South India—Voluntary Regulation of Rubber Exports.

It was reported that a joint circular from the R.G.A. and the South Indian Association in London had been forwarded to South Indian Producers, asking them to agree to a continuance of the voluntary scheme on the same basis as previously, for a further period of 12 months, ending 31st October, 1925.

Research Committee.

Rubber Research Institute Scheme, Malaya.—A cablegram was submitted from the Association's Local Secretary, Kuala Lumpur, advising that the Secretary for Colonies approves the recommendation for the establishment of the Rubber Research Institute, that a Resolution in favour of the Scheme will be moved at the next meeting of the Federal Council, and the necessary legislation will be introduced as soon as possible.

Progress Reports from Messrs. Pinching and Sanderson for September were submitted and perused. These dealt with visits to Estates; examination of and reports upon samples of rubber, chemicals and mycological specimens; repairs to Metrolacs; sole crepe; disinfectants; rust; paranitrophenol; silt pits; seeds for Burma; life of rubber trees; field experiments, bud-grafting.

Sole Crepe.—The Local Committee have agreed to the Senior

Scientific Officer giving a demonstration of sole crepe making at Petaling, invitations being sent to local members and District Planters' Associations.

It was decided to ask the Rubber Trade Association of London to arrange for the Standard Qualities Committee to forward for despatch to Mr. Pinching a selection of samples of sole crepe which satisfied present market conditions, such samples to be sufficiently large to permit of distribution if necessary.

The question of branding of sole crepe was discussed and it was decided that the London Consulting Chemist should experiment with dyes and stencils.

Glass Metrolacs.—An exhaustive report on the results of trials of Glass Metrolacs by various Estate Managers was submitted. Generally, the reports are distinctly favourable.

A report was also submitted by Mr. O'Brien, Chemist to the Ceylon Rubber Research Scheme, on trials with a new type of glass instrument, and it was decided to arrange for one dozen instruments to be forwarded to Malaya for experimental purposes.

Packing of Rubber.—With regard to the complaints of the use of highly polished nails in packing cases, it was decided that a suitable paragraph should be published in the Bulletin (see page 696).

Dr. O. de Vries' Book.—The International Association at The Hague propose to publish and issue to its members a book by Dr. O. de Vries, Director of the Central Rubber Station, Buitenzorg, Java. The book is entitled, "Rubber on the Market and in the Factory," and is a report of visits made to markets and factories in Europe and America.

It was decided that a sufficient number of the books should be ordered for distribution to Directors and Estates Staffs of Company Members of the R.G.A.

Netherlands Indies Committee.

Voluntary Regulation of Rubber Exports.—With reference to the circular forwarded on the 4th October to British Companies operating in the Netherlands East Indies, it was reported that Companies representing 159,114 acres had agreed to participate in the scheme to date, either to the full extent or with certain conditions.

Taxation.—Translation from the official report of the Ondernemersbond dealing with the 1925 Budget proposals was submitted and noted. (See also pages 689-90.)

Propaganda Committee.

Report of the Propaganda Committee was submitted and adopted, the principal matters dealt with relating to publicity for the crepe rubber sole in America and Great Britain; Customs Duty on crepe rubber; balloon tyres; rubber flooring; new uses; rubber mats for dredgers; Continental propaganda. (See also Propaganda Notes.)

Membership.

The following were elected Members of the Association:—

Thomas Bradwall Barlow.

Sir Wyndham Rowland Dunstan, K.C.M.G.

EXPORT RESTRICTION LEGISLATION.

The following further notices, etc., are recorded for the information of members :—

Federated Malay States.

Gazette Notification No. 6565 of 3rd October, 1924, states that :—

In exercise of the powers conferred upon him by Section 30 of "The Export of Rubber (Restriction) Enactment, 1924," the Chief Secretary to Government hereby exempts from the provisions of the said Enactment and Rules made thereunder, all rubber goods and samples of rubber not exceeding 11 pounds in weight, sent by parcel post and marked "Rubber Goods" or "Rubber Samples," as the case may be.

Gazette Notification No. 3223 of the 16th May, 1924, is hereby cancelled.

Gazette Notification No. 6816 of 3rd October, 1924, states that :—

Under the powers conferred by Section 2 of "The Rubber Supervision Enactment, 1924," it is hereby notified that the Resident of Selangor has appointed the Collector of Land Revenue, Kuala Lumpur, to be the Licensing Officer for the Kuala Lumpur district, for the purpose of that Enactment.

Gazette Notification No. 6871 of 10th October, 1924, states that :—

In exercise of the powers conferred on him by Section 28 of "The Export of Rubber (Restriction) Enactment, 1923," the Chief Secretary to Government hereby grants partial exemption from the provisions of the said Enactment for all purposes of export of manufactured rubber goods as follows :—

- (a) Shoe soles, clog straps, mats and tyres shall be deemed to have a rubber content of $33\frac{1}{3}$ per cent. of their total bulk.
- (b) All other manufactured rubber goods whether consisting wholly or partly of rubber shall be deemed to have a rubber content of 50 per centum of their total bulk.

"Manufactured rubber goods" means articles which are finished and ready for sale to the public for use without further treatment and in which the rubber has been subjected to such vulcanisation or other process or incorporated in such manner as has in the opinion of the Commissioner of Trade and Customs, whose decision shall be final, rendered it economically unfit for subsequent treatment as raw rubber.

Gazette Notification No. 6939 of 17th October, 1924, states that :—

In exercise of the powers vested in him by section 4 (i) of the Export of Rubber (Restriction) Enactment No. 8 of 1923, the Chief Secretary hereby appoints Mr. C. A. H. Smith to be an officer for the purpose of carrying into effect the provisions of the said Enactment.

The following appointments are notified under "The Rubber Supervision Enactment, 1924," in Government Gazette Notifications, as stated :—

17th October, 1924, No. 7145. Collector of Land Revenue, Seremban, as ex-officio Licensing Officer in and for the district of Seremban, with effect from 19th September, 1924.

17th October, 1924, No. 7146. Collector of Land Revenue, Seremban (Chairman), Assistant Protector of Chinese, Negri Sembilan; Superintendent, Revenue Surveys, Negri Sembilan; and Messrs. A. B. Cross and Towkay Cheah Soonmoh to constitute Licensing Board for Seremban district, with effect from 19th September, 1924.

Gazette Notification No. 7252 of 18th October, 1924, states that :—

In exercise of the powers vested in him by section 26 of "The Export of Rubber (Restriction) Enactment, 1923," the Chief Secretary to Government makes the following amendments to the rules published in *Federated Malay States Gazette* Notification No. 2841 of 29th April, 1924, to come into operation on the 1st day of November, 1924 :—

1. Rule 2 is amended by the addition of the following words :

"A restriction year" means a period of one year commencing on the 1st day of November in one year and ending on 31st day of October of the following year both dates inclusive.

2. Rules 6 and 7 are deleted, and 3 new rules numbered 6, 7 and 7A are substituted.

Rule 6.—

The following scale shall be adopted in assessing the standard production of holdings over 25 acres in area. On areas the trees on which were planted in

1920	...	...	...	...	60 lbs. per acre
1919	...	...	...	...	180 " " "
1918	...	...	...	...	240 " " "
1917 or previously	...	...	...	...	300 " " "

provided that (a) rubber planted in 1920 shall only be assessed if the Assessment Committee or District Officer, as the case may be, is satisfied that 60 per cent. of the trees are of tappable size; (b) areas the trees on which are burnt out or abandoned or otherwise unfit for tapping shall not be assessed; (c) if the trees on a holding are incapable of producing the amount of rubber allowed under the scale, by means of a system of tapping which complies with the standard laid down in rule 8, the Assessment Committee or District Officer, as the case may be, may vary the scale.

Rule 7.—

(i) An application for assessment of a holding in respect of which a certificate of standard production has not hitherto been issued, may be made by the owner of a holding once but not more than once within a restriction year. Such application shall be lodged with the Chairman of the Assessment Committee or the District Officer as the case may be. Provided that in any case of special hardship arising from manifest error without negligence on the part of the applicant

the Assessment Committee or the District Officer shall have power to receive and deal with a second application for assessment should the circumstances of such case appear to require it.

(ii) On receipt of such application a form of questionnaire will be sent to the applicant which must be returned within 21 days, correctly filled in, to the Assessment Committee, Rubber Restriction Office, Kuala Lumpur, or to the District Officer as the case may be. The answers to this questionnaire shall be verified by a statutory declaration under the Statutory Declarations Enactments, 1899, and may be supported by signed copies of documents.

Rule 7A.—

(i) On November 1st or as soon as possible thereafter in each restriction year, a statement of the proposed assessment for the current restriction year shall be issued to each owner of a holding in respect of which a certificate of standard production was issued in the previous restriction year.

(ii) Any owner of a holding desirous of objecting to such proposed assessment shall within 21 days of the issue of the statement of the proposed assessment notify the Assessment Committee or the District Officer, as the case may be, of his objection thereto and in addition shall lodge with the Assessment Committee or the District Officer, as the case may be, not later than two months from the date of the issue of such statement of proposed assessment, a statement of his grounds of objection and of the standard production at which he claims his holding should be assessed. The Assessment Committee or the District Officer, as the case may be, shall thereupon consider the grounds of objection lodged by the holder against the proposed assessment and assess the holding.

(iii) If any owner fails thus to lodge within the prescribed period of 21 days an objection to the proposed assessment or having lodged an objection within such period fails to submit, within two months from the date of the issue of the notification of the proposed assessment, a statement of his grounds of objection and of the standard production at which he claims that his holding should be assessed, a certificate of standard production based on the proposed assessment shall forthwith be issued, provided that an appeal shall lie against such assessment as laid down in rule 22.

3. Rule 11.—

In line 3 "1916" is deleted and "1917" substituted therefor.

4. Rule 12 is deleted, and the following is substituted therefor—

Rule 12.—

In the case of holdings over 100 acres in area, assessment shall be subject, in the discretion of the Assessment Committee, to an inspection of the property and each and every holding so inspected may be assessed either in whole or part, at the discretion of the Assessment Committee, on the basis of the report of such inspection irrespective of its crop records. The fee for such inspection must be deposited but may be remitted in whole or part by the Assessment Committee.

5. Rule 13 is deleted, and the following rules numbered 13 and 13A are substituted therefor—

Rule 13.—

If any owner of a holding assessed hitherto wholly or partly on scale claims that such holding is capable of producing more than the amount allowed as standard production the Assessment Committee or District Officer as the case may be may demand the production of such evidence as may be considered necessary, including—

(a) Inspection reports.

(b) Measurements.

(c) Crop records for such consecutive periods (exclusive of any part of the current restriction year) as in the opinion of the Assessment Committee may give an adequate indication of the yielding capacity of the area in respect of which the claim has been lodged,

and shall assess the holding.

Rule 13A.—

Pending assessment of a holding in accordance with rules 6-12, a provisional allowance in credits or coupons based on the certificate of standard production of the previous year may be given to the owner provided that the amount of credits or coupons given under this rule shall be liable to readjustment with effect from 1st November, 1924, after assessment in accordance with rules 6-12 and issue of the certificate of standard production. Any deductions may at the discretion of the assessing authority be spread over several quarters.

6. Rule 16 is amended by deleting the word "holdings" and substituting the words "areas planted with rubber" therefor.

7. Rule 20 is amended by the deletion of the figure "1919" in line 3 of clause (i) (b) and the substitution therefor of "1920," and by the deletion of the words "November, 1923" in the seventh line of clause (iv) (a) and the substitution therefor of the words "the current restriction year."

8. Rule 23 is amended—*Add* following clause:—

In any appeal from an assessment made under rule 7A if the appellant has failed to proceed under the provisions of clause (ii) of that rule the Central Committee may summarily reject such appeal without hearing the appellant.

MEMORANDUM.

The objects and reasons of these amendments to the rules under "The Export of Rubber (Restriction) Enactment, 1923," relating to the assessment of holdings are as follows:—

- (1) To advance the scale given in rule 6 by one year and otherwise to adapt the rules to a new restriction year, e.g., areas planted in 1919 which are eligible in 1924 for a standard production of 60 lbs. per acre would in 1925 become eligible for a standard production of 180 lbs. per acre.
- (2) To set out clearly the procedure in respect of the assessment of a holding and to afford to owners of holdings an opportunity of lodging objections to proposed standard production for further consideration by the Assessment Committee.
- (3) To extend the discretionary powers of the Assessment Committee in the matter of the acceptance of crop yields and thus obviate the necessity of harvesting crops in excess of a holding's exportable allowance merely in order to prove yields.

- (4) To amplify certain rules where the meaning is obscure.

Straits Settlements.

Gazette Notification No. 1728 of 20th September, 1924, states that :—

In exercise of the powers conferred on him by Section 4 (i) of the Rubber Restriction Ordinance, 1923, His Excellency the Governor has been pleased to appoint Mr. William Daubney Emptage to be an Officer under the above Ordinance, with effect from the 5th September, 1924.

Gazette Notification No. 1862 of 17th October, 1924, contains the names of Export Duty Officers, Malacca, appointed Restriction Officers under Section 4 (i) of the Rubber Restriction Ordinance, 1923.

Ceylon.

Gazette Notification No. 7422 of 4th October, 1924, states that :—

Notice is hereby given that His Excellency the Governor in Executive Council has, under the powers conferred on him by "The Rubber Restriction Ordinance, No. 24 of 1922," made the following rules.

RULES.

1. These rules may be cited as "The Rubber Restriction Rules, Short title, 1924."
2. In these rules, unless the context otherwise requires :— Interpretation.
 The Rubber Restriction Ordinance, No. 24 of 1922, is referred to as "the Ordinance";
 The expressions "assess" and "assessment" include reassess and reassessment.
3. (1) Whenever the Controller considers that the standard production of an estate assessed, under section 6 of the Ordinance or under any previous rules made thereunder or under these rules, is in excess of or less than the true productivity of that estate, he shall reassess the standard production of that estate at such amount as he considers to be the true productivity of the estate. Reassessment of standard production.
 (2) The standard production assessed under this rule shall take effect from November 1 next following the date of the assessment.
4. (1) For the purposes of these rules, the true productivity of an estate means the amount of rubber which, in the opinion of the Controller, can be properly produced from the estate under a normal system of tapping during the twelve months commencing on the day on which the assessment is to take effect. Meaning of "true productivity."
 (2) A system of normal tapping means a system which complies with the following standard, *viz.*, a standard which—
 (a) Does not exceed one cut on one-fourth of the circumference of the trees daily, or its equivalent;
 (b) Permits of a minimum—
 (i.) Of six years for the first bark renewal; and
 (ii.) Of eight years for the second and subsequent renewals.

(3) The amounts of rubber which can properly be produced under a normal system of tapping shall be taken not to exceed the following maxima, viz. :—

(a) For trees planted before 1919—

Age of Trees.		Maximum Amount per Acre.	
Under 5 years			Nil
Between 5 and 6 years			120 pounds
Between 6 and 7 years			180 pounds
Between 7 and 8 years			240 pounds
8 years and over			320 pounds

(b) For trees planted in 1919, the maximum amount per acre shall be—

60 pounds for the period November 1, 1923, to October 31, 1924; and

120 pounds, 180 pounds, 240 pounds, and 320 pounds, respectively, for each of the following periods of 12 months.

(c) For trees planted in 1920, the maximum amount per acre shall be—

60 pounds for the period November 1, 1924, to October 31, 1925; and

120 pounds, 180 pounds, 240 pounds, and 320 pounds, respectively, for each of the following periods of 12 months.

(4) In the case of small estates under ten acres in extent, the maxima specified in paragraphs (a), (b), and (c) of sub-clause (3) shall, as regards the first five acres in bearing, be increased by 33 $\frac{1}{3}$ per cent.

5. In making any assessment under these rules, where rubber is interplanted with other cultivations, 200 rubber trees shall be taken as the equivalent of one acre of rubber.

6. The Controller may nominate an assessor or assessors to advise and assist him in making any assessment under these rules.

7. (1) The Controller may direct that the assessment of an estate under ten acres in extent shall be made by the Government Agent or Assistant Government Agent of the Province or District in which the estate is situated.

(2) The Government Agent or Assistant Government Agent shall thereupon make the assessment and send notice thereof both to the proprietor and the Controller.

(3) The Controller, as well as the proprietor, may, within ten days of receipt of the notice, appeal against the decision to the Board, whose decision shall be final.

8. (1) Whenever, in the opinion of the Controller, there is a reasonable excuse for the failure of the proprietor of an estate to make the return required by section 6 of the Ordinance within due time, or where an estate has since November 10, 1922, come into bearing for the first time, the Controller may proceed to assess the standard production of the estate at the amount of its true productivity.

(2) The standard production so assessed shall take effect from November 1 next following the date of the assessment.

9. The standard production of an estate assessed under these rules shall be deemed to be the standard production of that estate assessed and determined under the provisions of the Ordinance until the standard production shall be altered under these rules.

Mixed
cultivation.

Assessors.

Assessment of
estates under
ten acres.

Assessment of
estates not
assessed under
section 6 of
Ordinance.

Duration of
assessments.

10. (1) Any proprietor who is dissatisfied with an assessment under these rules may, within ten days of his receiving notice of such assessment, appeal to the Board, whose decision shall be final. Appeals,

(2) Every such appeal shall be in writing addressed to the Board, and shall be forwarded under registered cover or delivered to the Controller within the time hereinbefore specified.

(3) It shall be the duty of the Controller—

(a) Forthwith to acknowledge receipt of every such appeal;

(b) To bring such appeal before the Board for consideration and decision as early as possible;

(c) Within three days of the decision of the Board to notify such decision to the appellant.

(4) Provided, however, that in the case of estates under ten acres in extent, every such appeal shall be forwarded under registered cover or delivered to the Government Agent or Assistant Government Agent, as the case may be, who shall, within seven days of the receipt thereof, forward it to the Controller with any observations that he may wish to offer. The Controller shall submit every such appeal to the Board as early as possible and communicate its decision thereon to the Government Agent or Assistant Government Agent concerned as well as to the appellant.

(5) Any appellant who desires to appear before the Board to support his appeal in person, shall give notice of his intention to do so to the Controller or to the Government Agent or Assistant Government Agent, as the case may be, at the same time as he forwards or delivers his petition of appeal as aforesaid.

11. (1) No monthly certificate of production issued by the Controller under section 11 of the Ordinance shall be transferable, except upon a *bona fide* sale of the rubber produced on the estate to which such certificate relates or on estates in the same ownership. Monthly certificates and credit notes.

(2) The Controller may, in exchange for monthly certificates of production, issue a credit note for the total quantity of rubber represented by the said certificates of production.

(3) The Controller may, in exchange for such credit note and in substitution therefor or in lieu thereof, issue sub-credit notes: Provided that the total quantities for which sub-credit notes are issued shall not exceed the quantity of rubber for which the original credit note was or could have been issued.

(4) No credit note or sub-credit note shall be transferable, except upon *bona fide* sales of the rubber to which the note relates.

12. The forms contained in the schedule hereto shall be used with such variations as may be permitted by the Controller. Forms.

13. (1) All previous rules made under the Ordinance are hereby repealed. Repealed.

(2) Nothing in these rules shall affect the notice for the time being in force fixing the percentage of restriction under section 3 of the Ordinance.

The *Gazette* contains a schedule with *pro forma* returns for assessment of standard production applicable to estates of 10 acres or over 10 acres in extent, and also for estates less than 10 acres in extent, notice of assessment, certificate of production, licence forms, credit notes, and application for export licence (copies of the forms can be inspected at the offices of the Association on application).

Kelantan.

Enactment No. 7 of 1924, entitled "The Rubber Dealers' Enactment, 1914, Amendment Enactment, 1924," states that The Rubber Dealers' Enactment, 1914, is amended by repealing Section 8 thereof and substituting therefor a new Section 8, as follows:—

8. Every licensee shall keep true books of account in Malay or English and there shall be entered therein day by day the following particulars concerning all purchases or receipts of rubber:—

- (a) The date of purchase or receipt;
- (b) the name and address of the seller or dealer from whom the rubber was received;
- (c) the title or lot number of the land on which the rubber was produced;
- (d) weight and description of the rubber purchased or received;
- (e) the price of sale;
- (f) the numbers of the coupons of quarterly licences to export covering the rubber purchased or received.

Every licensee shall also keep a true daily account of the quantity of rubber exported or transferred from his premises, in such a form as to enable at any time the stock of rubber on his premises to be ascertained.

NATIVE RUBBER IN THE DUTCH EAST INDIES.

On the 9th October, 1924, a meeting was held at Batavia convened by the Rubber Producenten Vereeniging (Rubber Producers' Association). The Chairman of the meeting was Mr. S. W. Zeveryn, Chairman of the R.P.A. (Tiedeman & Van Kerchem), and the following were also present:—Mr. R. C. M. Kindersley and Mr. T. J. Cumming from the Federated Malay States; Mr. W. Price (Bombay-Java Trading Co., Ltd.); Mr. D. Lageman (Geo. Wehry & Co.); Mr. C. M. Hamaker (International Association, The Hague); Mr. J. A. Dekeratel (Netherlands Trading Society); Mr. P. A. Daniel (Harrisons & Crosfield, Ltd.); Mr. G. Lungley (Francis Peek & Co., Ltd.); and Mr. J. Ch. Bik (Tiedeman & Van Kerchem), Secretary.

The Chairman in welcoming Messrs. Kindersley and Cumming, referred to the question of native grown rubber in the Netherlands Indies, and the resolution passed at the Conference of Planters held at Djocja, on 21st February, 1924, as a result of which Dr. N. R. Pekelharing and Mr. T. J. Cumming visited the Residency of Djambi, Sumatra, in July and August last with a view, *firstly*, to get into touch with local Djambi conditions, and, *secondly*, to obtain as much Djambi rubber data as possible at first hand, and, *thirdly*, to ascertain whether it would be possible, and if so in what manner, to prepare a general scheme for counting trees or measuring areas under rubber, by special expeditions to the districts where native rubber is largely grown, *viz.*, Djambi itself, Palembang, Indragiri, South and West Borneo, etc. He regretted that, owing to illness Dr. Pekelharing was unable to be present at the meeting, and drew

attention to the report which had been drawn up by Mr. Cumming. (A summary of the report is published in the BULLETIN for October, pp. 592/6). The Chairman read the following extracts from the report recording Mr. Cummings' conclusions and stated that Dr. Pekelharing fully agreed with the views expressed :—

Possibility of ascertaining area under rubber.

I consider any scheme for counting trees or measuring areas under rubber by special expeditions to be out of the question in this territory, which is—practically speaking—without railways, roads and land registry. The cost would be enormous and the results unreliable. I cannot conceive it possible for a special expedition to count trees and make a detailed survey under a period of five years.

However, I am of opinion that the existing machinery for assessing income-tax can be adapted and utilised for the collection of statistics relating to the output of rubber and the number of trees planted. So far as Djambi is concerned, it would be a comparatively easy matter to check exports from each of the six district centres enumerated in Section 12, while at Djambi—the only outlet of any consequence—a final checking could be done.

Dr. Pekelharing's proposals.

Dr. Pekelharing outlined to me verbally certain proposals for arriving at more accurate information relating to the number of trees in Djambi by the help and co-operation of the Controleurs. I have prepared from memory the following summary on the proposals to which I refer, namely :—

At present certain data regarding planted areas and number of trees are collected by the Controleur for purposes of assessment for income tax. The procedure is that the Controleur, with his native assistant (Dimang), goes to a village and orders the village Headman (Kapala Dusun), or "Rio," to muster the villagers to declare how many rubber trees they own. The Controleur then reckons so many katties to a tree, and assesses the owner accordingly. It is not to be expected that the owner will declare anything like the correct number of trees, and besides that, the Headman is not taxed, so that many more trees than he owns are put to the Headman's account.

No account is kept of the actual rubber produced or exported from any particular district. Dr. Pekelharing is confident that collection of this information can be done much more accurately by getting the Controleurs more interested in the rubber position from the industry's point of view, as well as a source of revenue by taxation. He has already given the Controleurs a mild form of Questionnaire to work on, the most important items being the number of trees or area planted prior to 1919. The same from 1920 to 1923, and the area now being opened for "ladangs" where rubber is likely to be planted. Further, he hopes to be able to obtain figures of the output from the several districts—Mo. Tebo, Boenga, Bangko, and Sarolangoen. A reference to the map will show this can be fairly easily done by having checking stations on the river below the various places. The difference between the total of these figures

and the final checking at Djambi, the only port of export, will give the output from Tembesi and Djambi itself.

In addition to this, a reconnaissance, extending probably over a period of three months, would be made by two men, one a Government Officer, in order to keep in touch with the Civil Service, and the other a practical planter. They would work their way slowly through the country from village to village, making careful notes of what rubber they see, approximate age, condition of planting, whether cleared or in jungle, conditions of bark, labour, etc., comparing as they proceed the information already collected by the Controleurs, with which they would be furnished. This arrangement, although not obtaining definitely accurate figures of area planted or the actual number of trees, would do much to prevent surprises in the way of sudden increase of output such as occurred in 1923.

The cost of such an expedition would be roughly:—

Two men at Fl.1,000 each per mensem ...	Fl.2,000
Travelling expenses	750
Sundries	250

Total Fl.3,000

Say for 12 months Fl.36,000.

This would allow of Djambi, Palembang, Borneo, and Riau, being visited in one year, giving three months to each territory. This scheme would be best managed from Batavia, by a standing committee of three persons who would be responsible for programme and expenditure; say the Director of Agriculture, as Chairman, with two leading men in the industry. There would be an Officer in this country such as the Controller of Rubber Exports, nominally on the committee, who would be kept "au fait" with the proceedings of this committee.

The Chairman stated that the object in calling the meeting was to ascertain the views of those present on the proposals for the investigation and the formation of the Standing Committee. He intimated that Dr. Rutgers, the Director of Agriculture, had not only intimated his willingness to act as Chairman of the Committee, but had also promised all the support the Government could give in the direction indicated in the report. He, the Chairman, was of opinion that Dr. Pekelharing should be appointed on the Committee and be that Committee's leading technical adviser, in which case there was not much chance of doing any serious work until Dr. Pekelharing was quite well. There was no one in Java with anything like the experience of Dr. Pekelharing in the matter of native rubber in Insulinde's outer districts.

During the discussion it was pointed out that it might not be easy to find practical planters for the purpose, but Mr. Kindersley had promised that in case of need the F.M.S. would be pleased to help in this respect. With regard to the money required, the estimate had been increased to Fl.50,000, all of which had been practically found, the chief contribution coming from the Rubber Producers' Association. The Chairman stated that, arising from the discussion, they may take it for granted that the meeting approved the proposals. He suggested that the Committee of the

R.P.A. be the Committee outlined by Dr. Pekelharing with the exception that the three Batavia members act as Standing Committee, this Executive body to be formed by Mr. Price, Mr. Lageman, and himself. It would curtail the work a good deal and things would be done quicker in this way than by appointing members from Medan, Bandoeng, etc. Dr. Pekelharing should also be asked to become a member, and the Committee should have power to co-opt additional members, including a representative from the F.M.S. This proposal was carried unanimously.

It was agreed that the Committee, when finally constituted, should communicate their views to Mr. Kindersley, who would then place them before the Chief Secretary to the F.M.S. Government, with a recommendation that a member should be nominated to represent the F.M.S. on the Committee.

The question of expenses was discussed, a member pointing out that the estimate should be put at Fl.120,000, as he did not see how it was possible to get the required men at Fl.1,000 a month. The Chairman suggested how the expenses could be kept down to a minimum, but in the event of the figure of Fl.50,000 being insufficient it would be necessary to ask for further pecuniary assistance.

Mr. Kindersley stated that while they did not know what would be the result of the enquiry they were about to undertake, in case it was proved that the production of native rubber was a real menace to the European planting industry, he suggested that the Rubber Producers' Association might consider what steps could be taken to deal with such a situation. He referred to schemes which were being discussed in London and the Federated Malay States, and expressed the hope that if any scheme was evolved in Java it would be communicated to other Producers. The Chairman stated that if any scheme of the nature referred to was evolved in Java he hoped it would be brought to the notice of the Committee right away, although he pointed out that the influence in the Netherlands Indies cultures was mainly exercised in Europe.

Mr. Cumming emphasised the fact that his report was just an account of a 3 weeks' tour through Djambi and that it could not be taken to apply to the whole Residency or to the Netherlands Indies in general. He was confident that something could be done successfully in the manner suggested by Dr. Pekelharing and himself. He was convinced that a further investigation would be worth while.

The meeting concluded with a vote of thanks to Messrs. Kindersley and Cumming for coming to Java and attending the Conference.

THE THINNING OUT OF RUBBER IN SOUTH INDIA.

The following is a paper read by Mr. H. Ashplant, A.R.C.S., mycologist attached to the Rubber Research Organisation of the United Planters' Association of Southern India, at the annual meeting of that body held in October, 1924:—

A few months after my arrival in South India, before, in fact, I had time to settle down and study local conditions, I was requested

by the South Indian branch of the R.G.A. to give a lecture at their Annual Meeting in Cochin on some rubber topic. As little time was given for preparation, I chose for discoursing upon a subject, which from some experiments made during my last year or so in the Dutch East Indies was fresh in my mind, i.e., "Selective Thinning Out." Another reason, apart from its familiarity, which influenced me in choosing this particular subject was the opportunity it gave of emphasizing the extraordinary differences in the milking qualities of rubber trees—differences which up to that time seemed to be but dimly appreciated in South India.

Although the title of the paper was "Selective Thinning Out," I said little by way of advocacy of this operation, thinning out being then, in the lowest trough of depression the industry has known, scarcely feasible. My purpose was rather to drive home the fact that on every rubber estate there existed some 5 to 7 per cent. of trees, the yields from which would not, with rubber at 7d., or thereabouts, pay the costs of harvesting and marketing. Trees of this character, though of questionable value as assets, could not at that time be dug out owing to the expense involved, so the question of their removal was left over for the future, and I dwelt instead on the necessity for a survey and classification of the trees, pointing out that trees of the lower grade mentioned were only being tapped at a loss, and should be excluded from the tapping round.

While there is little in the original lecture which I would wish to retract, certain of the experimental results described would, I am now convinced, not be obtained in this country. Longer residence in South India and greater familiarity with local conditions have very strongly impressed me with the conviction that thinning out, in the sense of and on the scale on which it is undertaken in countries further East, is quite impracticable here.

Before giving the reasons for this statement, it might be as well to discuss for a moment the ideas we have in view in thinning out.

In countries like Malaya, where climatic conditions are very favourable, and where growth is unchecked by recurring epidemics of disease, *Hevea* trees increase in crown expansion and root and trunk development at such a rate that by the time a block of rubber planted 120 to the acre reaches its eighth year, the trees are already jostling one another for space. The branches of the trees interlock, and owing to their mutual interference, the crowns, which would normally assume a spreading habit, become drawn up and attenuated. This drawing up of the crowns is followed by other changes. The foliage on the lower branches, through lack of light nourishment, tends to become scantier, and as time goes on, the branches die off.

These are the earlier indications of overcrowding. As the competition for food and root space gets keener, the cramping and malnutrition of the trees become manifest in a reduced rate of trunk development and poorer bark renewal after tapping.

Now not only for the reason that bigger circumferences mean more latex, but also because progressive increase in trunk size goes hand in hand with good bark renewal and improved yields, there is bound to come a time in the life of an estate under the conditions described, when the management will have either to put up with a general deterioration in all their trees, or to make up their minds to

sacrifice a percentage of the stand in the interests of the remainder. Thinning out, then, is an inevitable and rational measure in the development of a healthy rubber estate. Whether the measure is applicable under the abnormal growth conditions of South India will be discussed presently.

Proposals for thinning out met at one time with considerable opposition, owing to the mistaken belief that the removal of a number of the trees would entail a permanent loss in productivity. With the more general realization of the different yield capacities of rubber trees, however, thinning out no longer gives rise to such heart burning. There is no estate which has not amongst its trees a goodly percentage of poor milkers, and experience shows that by a careful selection, stands can be thinned to a number which will insure the future of the estate without leading to anything but a very slight temporary loss in crop. Within a year or two, when the survivors have had time to respond to the better conditions, the all round improvement in the trees more than makes good any set back to crop immediately following the thinning.

The foregoing sets forth, as briefly as I can put, the place and justification of thinning out in rubber estate practice. It does not require any lengthy period of observation to bring home to one that in South India the conditions portrayed as necessitating general thinning out do not obtain. A few years ago, perhaps a few of the older estates might have displayed the premonitory symptoms of overcrowding. The condition of estates to-day is more in accord with a diagnosis of over-spacing than of overcrowding. On the older plantations the trees generally are losing as many branches as they are putting on. There is no question of mutual interference. Far from this being the case, indeed, the foliar spread is of such a character as to justify 150 trees to the acre instead of the 80 or 90 which estates in other countries generally get down to at the same age.

With regard to evidences of root overcrowding, these are obviously more difficult to see, but since there is a close relation between foliar expansion and root development, we shall be safe in concluding that with leaf activity at a low ebb, little necessity exists for new root development.

This is the situation as it appears to ordinary observation. Whether this reading is correct or not can easily be settled. If trees are being handicapped in growth by their neighbours, they will, when the handicap is removed, very speedily respond to the improved conditions. Notwithstanding the remarkable responses recorded in Malaya, we know, unfortunately to our cost, that the experiments in thinning out made in South India during the last few years have produced extraordinarily little betterment in the surviving trees. On two estates in the Mundakayam district blocks of 12 to 15 year old rubber were in 1919 thinned down from a 110 to 70 or 80 trees per acre. In neither case are there any signs as yet of the yields from the thinned blocks attaining former standards. Fields, on the contrary, are not only still down, but they are *down proportionately to the number of trees removed*.

Planters in South India have never been wholly converted to the drastic thinning programmes favoured further East, and it is just

as well that they have been a little conservative in this matter. In view of what has happened on the one or two estates which have extensively thinned some of their areas, it is clear that thinning out on a considerable scale is bound in this country to be a disastrous proceeding. The only thinning out that one would recommend doing locally is the removal of trees which have ceased to yield, and on which the bark is too thin to justify any hope of successful Brown Bast treatment. These trees which will not usually amount to more than about 7 per cent. of the stand might, after careful testing, be removed to the advantage of the other trees. As for trees which are still yielding, a stand of round about 120 fifteen-year-old trees can, under present conditions, be comfortably accommodated on an acre of land. It is unwise to eliminate from blocks whereon the trees are not in excess of this number any tree which pays for tapping or from which one has expectations of yield.

I noticed some time ago that on one South Indian Estate trees were being removed for no other reason than that they have once been pollarded. No overcrowding to speak of was manifest on this estate, and utmost thinning justified would have been the elimination of the few non-yielding trees.

As some people seem to regard trees which have once been pollarded as the first candidate for removal in a thinning out scheme, a few words on these may not be amiss. There is no reason for condemning out of hand trees which have once suffered the mishap of being pollarded. Within my own experience, I have known trees of this character to give phenomenal yields. In 1914 a big hurricane swept through the estate on which I lived, blowing over several thousand trees. These trees were pollarded and stood up again. Some five years afterwards, when engaged in taking measurements of the individual tree yields in these blocks, I was surprised to find that most of the storm damaged trees were still yielding well. Among the pollarded trees were some of the finest yielders on the estate.

The foregoing will, I trust, have made the position regarding thinning out in South India quite clear. We must not blindly follow the practices of other countries in this or any other respect. Owing to the debilitating factor of Secondary Leaf Fall, the benefits which follow from the operation of thinning out in countries further East will not be obtained locally. *Yields can in South India only be maintained by maintaining a large number of trees per acre. Any reduction in the number of trees involving the removal of yielders will mean a permanent loss of crop.*

The conclusions I have come to regarding thinning out in this country seem also to apply in some measure to Ceylon. Growth in Ceylon, so far as I could see during my recent visit, is becoming restricted from similar causes as are operating in South India, crown interference being little noticeable. Although a few years ago thinning out could, as examples show, be done with profit it is doubtful whether the results would be repeated to-day. It is worth noting that the estates which give the best yields in Ceylon are, as a general rule, the estates with the most trees per acre. One gathers that several of the first-rank estates still retain 130 to 150 trees per acre.

STATISTICS.

RUBBER MARKETS.

Fluctuations in prices of No. 1 Grades.

	LONDON.		NEW YORK (a).		SINGAPORE (b).	
	High.	Low.	High.	Low.	High.	Low.
	s. d.	s. d.	Cents.	Cents.	Cents.	Cents.
Week ended 1st Nov., 1924—						
Crepe	1 5½	1 5½	34½	32½	62	58½
Sheet	1 5½	1 5½	34½	32½	62	58½
Fine Hard Para ...	1 5½	1 5½	—	—	—	—
Week ended 8th Nov., 1924—						
Crepe	1 6½	1 5½	34½	34½	61½	59½
Sheet	1 6½	1 5½	34½	34½	61½	59½
Fine Hard Para ...	1 6	1 5½	—	—	—	—
Week ended 15th Nov., 1924—						
Crepe	1 5½	1 5½	34½	34½	61	58½
Sheet	1 5½	1 5½	34½	34	61	58½
Fine Hard Para ...	1 6	1 6	—	—	—	—
Week ended 22nd Nov., 1924—						
Crepe	1 5½	1 5	34½	34	59½	58½
Sheet	1 5½	1 4½	34½	33½	59½	58½
Fine Hard Para ...	1 6	1 5½	—	—	—	—
Week ended 29th Nov., 1924—						
Crepe	1 5½	1 5	34½	34½	61	59½
Sheet	1 5½	1 5	34½	34½	61	59½
Fine Hard Para ...	1 5½	1 5½	—	—	—	—

(a) From Messrs. Wilson, Holgate & Co.'s daily cable.

(b) From Messrs. Lewis & Peat's daily cable.

RATES OF EXCHANGE.

Fluctuations between 27th October and 29th November, 1924.

	Highest.	Lowest.	Average.
Rupee	18½d.	17½d.	17½d.
Amsterdam, Fl. to £1 ...	11.56	11.43	11.49½
Singapore, Dollar	28½d.	28½d.	28½d.
New York, Dollar to £1 ...	4.63½	4.49½	4.59½

TABLE 1.

United Kingdom Rubber, 1923, 1924.
Imports, Exports, Stocks and Deliveries.
Stocks at December 31st, 1922 - 81,081 tons.
(Quantities in Tons.)

MONTH.	Gross Imports.	Exports	Net Imports.	Stock* at end of month.	Increase of Stocks during month.	Deliveries to Manufacturers and to Warehouses, &c., other than those included in Column 4.
	(1)	(2)	(3)	(4)	(5)	(6)
1923.						
January	6,028	3,631	2,397	82,144	1,063	1,334
February	6,281	6,305	—24	78,385	—3,759	3,735
March	6,942	6,809	133	70,649	—7,736	7,869
April	5,343	9,795	—4,452	65,491	—5,158	706
May	4,360	9,368	—5,008	60,918	—4,573	—435
June	4,520	6,414	—1,894	57,108	—3,810	1,916
July	5,515	4,911	604	55,937	—1,171	1,775
August	4,483	2,358	2,125	54,243	—1,694	3,819
September	11,896	3,630	8,266	60,697	6,454	1,812
October	8,954	3,547	5,407	65,168	4,471	936
November	8,239	6,072	2,167	66,566	1,398	769
December	7,600	4,767	2,833	66,828	262	2,551
	80,161	67,607	12,554			26,787
1924.						
January	6,015	7,054	—1,039	63,812†	—3,016	877
February	5,679	7,217	—1,538	62,822	—990	—548
March	5,815	6,114	—299	61,554	—1,268	969
April	4,888	4,570	328	60,640	—914	1,242
May	4,793	5,870	—1,077	56,811	—3,829	2,752
June	4,137	4,491	—354	56,134	—677	323
July	6,170	4,520	1,650	56,816	682	968
August	5,526	4,248	1,278	54,298	—2,518	3,796
September	5,708	6,042	—334	48,058	—6,240	5,906
October	5,642	10,212	—4,570	40,936	—7,122	2,552
November						
December						

* Stocks in London and in the six recognised warehouses in Liverpool.

† Adjusted for rubber destroyed by fire at Concordia Wharf.

TABLE 2.**Stocks of Rubber at the end of each month, 1923, 1924.**

(Quantities in Tons.)

Period.	London. (a) (c)	Liverpool (b)	Total, London and Liverpool.	Am- sterdam.	Antwerp.	Para.	Singapore.	Penang.
Jan. 1924 ...	57,460 (d)	6,352	63,812	1,299	118	2,372	20,989	3,406
1923 ...	73,498	8,646	82,144	1,049	160	1,038		
Feb. 1924 ...	56,732	6,090	62,822	1,190	39	1,638	20,962	2,777
1923 ...	70,483	7,902	78,385	827	67	1,547		
March 1924 ...	55,647	5,907	61,554	1,087	53	1,086	18,950	2,538
1923 ...	63,438	7,211	70,649	865	138	619		
April 1924 ...	54,559	6,081	60,640	947	95	1,070	16,954	2,121
1923 ...	58,770	6,721	65,491	1,072	33	1,103		
May 1924 ...	51,615	5,19	56,811	1,164	65	1,149	16,279	1,700
1923 ...	54,439	6,479	60,918	889	56	474		
June 1924 ...	51,115	5,019	56,134	1,257	66	1,244	13,902	2,057
1923 ...	51,050	6,058	57,108	910	89	632	16,917	3,571
July 1924 ...	52,073	4,743	56,816	1,197	114	1,190	16,901	2,621
1923 ...	49,937	6,000	55,937	773	121	941	20,952	2,937
Aug. 1924 ...	49,700	4,598	54,298	806	149	790	17,393	3,157
1923 ...	48,427	5,816	54,243	918	171	861	23,192	3,721
Sept. 1924 ...	44,011	4,047	48,058	414	205		16,648	3,211
1923 ...	54,523	6,174	60,697	1,173	38	882	23,121	3,716
Oct. 1924 ...	37,523	3,413	40,936	271	92		16,389	2,652
1923 ...	58,891	6,277	65,168	1,358	28	1,433	21,644	3,134
Nov. 1924 ...								
1923 ...	60,074	6,492	66,566	1,092	64	1,049	20,534	3,219
Dec. 1924 ...								
1923 ...	60,246	6,582	66,828	1,177	103	1,502	20,235	3,114

(a) In wharves and warehouses.

(b) In the six recognised public warehouses.

(c) Including latex.

(d) Adjusted for rubber destroyed by fire at Concordia Wharf.

TABLE 3.**Exports of Rubber from undermentioned Countries,
1923 and 1924.—Quantities in Tons.**

Period.	British Malaya (a)	Ceylon.	Java.	Sumatra (E. Coast only).	Other Districts in N.E.I. (b)	India.	Borneo.	Sarawak.	French Indo- China.	Brazil.
Jan. 1924	23,848	3,068	3,268	4,396	6,068	1,077	302	397	549	2,625
1923	22,871	3,897	2,146	4,301	4,530	948	399	426	224	2,689
Feb. 1924	19,395	3,652	3,342	4,457	5,546	801	360	366	417	2,260
1923	19,908	3,407	3,861	2,653	3,596	742	257	215	721	1,386
Mar. 1924	22,294	4,054	3,601	3,788	6,101	976	333	332	400	2,004
1923	23,646	4,623	2,422	4,304	4,933	691	346	272	318	2,084
April 1924	20,551	1,679	3,724	3,578	7,016	468	332	288	533	1,911
1923	24,009	2,518	3,427	2,983	4,668	390	344	335	278	1,854
May 1924	19,674	1,797	3,644	3,516	4,651	392	333	345	568	2,456
1923	20,115	2,711	2,525	3,356	4,103	293	254	327	434	2,007
June 1924	18,084	1,838	2,911	3,865	5,947	615	348	325	593	1,824
1923	18,621	2,037	2,865	3,227	4,050	438	261	319	362	975
July 1924	21,670	3,120	3,578	3,920		448		364	619	
1923	16,749	3,055	2,439	3,534	5,480	386	374	377	497	971
Aug. 1924	22,133	2,932	4,196	4,741		353		388	583	641
1923	19,672	3,151	1,706	3,866	5,207	180	293	414	287	1,360
Sept. 1924	25,127	4,345	3,916	5,238		305			558	
1923	21,955	2,511	2,294	3,757	4,431	504	362	278	591	1,653
Oct. 1924	20,270	3,460		5,152						
1923	21,424	2,052	2,621	4,527	4,883	352	463	362	449	1,418
Nov. 1924										
1923	17,543	2,997	3,545	5,261	5,334	588	338	386	489	2,476
Dec. 1924										
1923	25,501	4,162	3,716	5,196	5,411	875	546	240	496	1,171
Total 1924										
1923	252,014	37,111	33,567	46,965	56,626	6,417	4,237	3,951	5,146	20,044
				(c)						

(a) Gross exports from British Malaya include the re-exports of rubber imported from the Netherlands, East Indies, British North Borneo, Sarawak, French Indo-China, and other neighbouring countries.

(b) This consists mainly of wet native rubber, and no allowance has been made for moisture, etc.

(c) Revised Total with adjustment of 342 tons for first six months (made on June figure) and of 605 tons for second six months (made on December figure).

NOTE: In the above Table the Gross Exports from British Malaya have been substituted for the Net Exports hitherto given, as, owing to the large quantities of moisture, etc., in the Dutch Native Rubber these latter figures do not accurately represent the Domestic Exports from British Malaya. The official figures for Exports and Imports Malaya are given in Table 4, but no allowance has been made in the Import figures for the moisture, etc., in the Dutch Native Rubber.

TABLE 4.
Malayan Rubber Statistics.
 (Quantities in Tons.)

Period.	Gross Exports.	Imports.	Of which from	
			British Possessions and Protectorates.	Other Countries.
Jan. 1924	23,848	8 867	755	8,112
1923	22,871	4,358	773	3,585
Feb. 1924	19,395	7,440	789	6,651
1923	19,908	4,089	583	3,506
Mar. 1924	22,294	8,269	751	7,518
1923	23,646	5,108	488	4,620
Apr. 1924	20,551	7,909	591	7,318
1923	24,009	5,389	705	4,684
May 1924	19,674	7,259	866	6,393
1923	20,115	5,020	602	4,418
June 1924	18,084	7,435	614	6,821
1923	18,621	4,957	579	4,378
July 1924	21,670	9,777	717	9,060
1923	16,749	5,624	495	5,129
Aug. 1924	22,133	9,776	971	8,805
1923	19,672	7,042	754	6,288
Sept. 1924	25,127	9,291	766	8,525
1923	21,955	5,269	570	4,699
Oct. 1924	20,270	9,931		
1923	21,424	6,341	683	5,658
Nov. 1924				
1923	17,543	7,442	727	6,715
Dec. 1924				
1923	25,501	68,203	772	6,792
Total 1924				
1923	252,014	68,203	7,731	60,472

Monthly Net Imports of Rubber,

PERIOD.		United Kingdom.	United States.	* France.	* Italy.	* Japan. (a)	Germany.	Austro- Hungary (b)
Jan.	1924	-1,039	21,042	3,157	1,236		885	2
	1923	2,397	34,729	1,696	339	1,105	2,455	
	1922	-1,977	23,588	2,451	388	1,754	2,275	4
Feb.	1924	-1,538	30,780	3,069	534		1,169	2
	1923	-24	26,088	1,967	625	817	1,846	4
	1922	-2,101	29,440	2,065	357	1,723	1,427	4
March	1924	-299	19,651	3,596	737		1,532	7
	1923	133	29,814	2,786	660	1,276	2,236	6
	1922	646	28,012	3,032	660	1,683	2,752	5
April	1924	328	37,162	3,544	650		2,016	5
	1923	-4,452	30,298	2,502	656	1,465	1,383	4
	1922	2,354	18,947	2,147	373	1,209	2,282	1
May	1924	-1,077	26,823	3,452	460		2,664	1
	1923	-5,008	34,822	1,926	790	1,198	1,022	3
	1922	2,850	15,678	1,991	717	695	2,824	1
June	1924	-354	21,393	3,950	1,212		1,923	3
	1923	-1,894	34,572	2,596	736	915	1,608	2
	1922	2,222	22,544	1,949	566	567	2,296	9
July	1924	1,650	18,891	1,335	507		1,470	6
	1923	604	19,565	1,719	419		1,216	2
	1922	1,620	25,084	1,935	599	667	2,643	2
Aug.	1924	1,278	21,217	3,073	724		1,475	3
	1923	2,125	18,609	2,535	390		1,474	3
	1922	1,919	23,973	1,892	338	1,502	2,367	5
Sept.	1924	-334		2,009			1,722	3
	1923	8,266	11,013	2,830	846		1,623	1
	1922	-107	19,423(d)	2,351	476	1,919	2,271	3
Oct.	1924	-1,570						
	1923	5,407	16,998	3,523	855		1,668	5
	1922	-841	32,959	3,157	781	2,015	2,601	7
Nov.	1924							
	1923	2,167	14,773	3,574	1,151		1,269	3
	1922	1,170	23,707	2,472	443	1,812	1,748	7
Dec.	1924							
	1923	2,833	29,130	3,518	1,024		721	3
	1922	3,346	32,923	2,218	733	1,035	2,065	9
Total	1924							
	1923	12,554	300,411	31,172	8,491		18,521	44
	1922	11,101	296,278	27,660	6,431	16,581	27,551	53
	1921	42,116	179,634	14,828	3,906	23,164	21,583	88
	1920	56,969	248,746	16,278	6,124	6,063	12,604	
	1919	42,521	236,958	20,101	9,895	10,774	4,500	

NOTES.—* Including gutta percha. (a) Gross imports only; figures for re-export Kingdom, Netherlands, and Germany. (c) Figure for quarter. (d) Imports for three

5.

2, 1923, 1924.—Quantities in Tons.

Spain (a)	Netherlands.	Norway.	Sweden.	Denmark.	Belgium.	Canada.
	—35	17	193	45	273	1,470
53	—131	31	95	28	—102	990
3	—818	21	51	3		1,164
	—180	35	196	59	289	1,008
67	—359	38	189	6	168	1,348
—	—11	18	55	—		449
	—160	34	124	37	223	1,623
90	—184	15	92	10	116	2,150
87	—156	31	168	2	18(c)	953
	—76	33	205	26	225	1,393
76	268	63	69	24	287	1,973
57	316	19	126	14		1,059
	265	65	187		159	1,483
32	245	55	114	35	216	1,218
43	337	31	82	20		780
	393	59	131		248	1,379
39	—116	21	71	42	121	874
39	—225	15	124	25	534(c)	718
	110	158	116		253	741
6	—191	33	60	16	137	1,047
102	41	13	12	18		466
	—147	39	134		268	840
60	197	17	107	20	145	769
62	—800	21	81	14		748
	—636	80	76		271	822
49	189	44	106	63	271	630
51	—159	34	235	10	—25(c)	634
	—171		146			
42	1,092	43	215	57	292	824
37	—223	37	133	3		767
	—157	45	134	33	271	773
84	—1,323	47	50	6		1,045
	—58	44	141	25	233	583
24	—783	38	131	19	—323(c)	585
	795	449	1,393	359	2,155	13,179
589	—3,804	325	1,248	134	204	9,368
3,557	1,022	191	814	256	1,705	8,247
4,109	5,510	242	1,567	500	3,408	11,907
3,702	2,772	438	2,023	697	3,994	8,755

available. (b) The figures in this column include the exports to Austria from the United Kingdom ending 21st September.

TABLE 6. Monthly Exports of Rubber from the United Kingdom, 1922, 1923, 1924.
(Quantities in tons.)

Destinations.	Years.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Total.
Russia ..	1924	400	—	—	—	—	—	—	—	3	—	—	—	—
Sweden, Norway and Denmark	1923	—	—	—	—	393	39	—	384	1,016	377	2,100	197	4,506
	1922	—	—	—	—	13	16	—	—	1,694	898	358	100	3,079
	1924	150	273	65	120	123	22	76	47	26	35	—	—	—
	1923	34	125	90	33	84	27	29	43	78	79	70	71	763
	1922	13	44	70	65	47	86	23	18	61	39	11	24	501
Germany...	1924	136	485	615	846	1,175	445	649	685	538	839	—	—	—
	1923	1,009	223	470	597	231	602	382	373	571	458	541	185	5,642
	1922	751	725	1,038	643	834	643	546	385	379	303	273	527	7,110
Belgium ..	1924	137	212	250	131	132	106	157	161	91	192	—	—	—
	1923	118	175	159	176	172	68	37	97	152	237	1,347	142	2,880
	1922	94	135	119	155	95	109	60	99	34	40	87	49	1,076
France ..	1924	1,376	1,919	1,431	1,623	1,810	1,589	706	436	421	458	—	—	—
	1923	1,124	1,484	1,265	1,718	1,424	1,196	1,015	925	942	1,493	1,131	1,140	14,857
	1922	1,619	1,121	1,344	825	1,023	624	1,020	933	1,025	1,513	755	1,132	12,934
Spain ..	1924	24	38	54	25	58	20	35	21	26	58	—	—	—
	1923	27	36	11	9	14	8	7	4	41	19	33	32	241
	1922	47	73	18	20	72	21	15	32	17	29	12	30	386
Italy ..	1924	337	475	401	528	408	392	276	176	176	400	—	—	—
	1923	347	342	288	454	293	325	204	423	363	515	433	519	4,506
	1922	188	136	260	249	264	116	236	167	315	159	187	200	2,477
Austria Hungary	1924	—	11	70	—	—	29	—	8	—	11	—	—	—
	1923	—	—	20	—	—	—	—	—	—	—	—	—	20
	1922	21	10	—	10	—	30	5	—	—	1	—	—	77
Other Countries in Europe	1924	34	22	76	128	112	195	151	73	32	78	88	144	948
	1923	176	74	65	14	51	29	66	3	51	187	39	48	945
	1922	65	81	181	28	151	178	46	42	62	24	—	—	—
United States ..	1924	3,937	3,626	2,613	966	1,742	1,365	2,439	2,428	4,693	8,059	—	—	—
	1923	779	3,457	4,095	6,415	6,534	3,956	2,706	56	301	104	304	2,004	30,711
	1922	5,660	4,096	1,634	1,011	686	739	610	1,238	672	2,431	2,886	847	22,510
Canada ..	1924	475	134	492	169	290	264	10	176	48	—	—	—	—
	1923	1	378	328	312	120	146	426	9	51	22	—	316	2,109
	1922	38	85	61	16	60	20	134	282	110	281	80	90	1,257
Other Countries...	1924	48	22	47	24	20	66	21	37	36	34	—	—	—
	1923	16	11	18	67	52	18	39	41	64	56	25	17	424
	1922	1	3	26	32	24	76	44	39	22	49	54	51	421
Total ..	1924	7,054	7,217	6,114	4,570	5,870	4,491	4,520	4,248	6,02	10,212	6,072	4,767	67,607
	1923	3,631	6,305	6,809	9,795	9,368	6,414	4,911	2,358	3,630	3,547	6,072	4,767	67,607
	1922	8,497	6,509	4,751	3,057	3,269	2,658	2,739	3,235	4,391	5,827	4,742	3,098	52,773

TABLE 7.**Exports of Latex from undermentioned Countries, 1923 and 1924—Quantities in Gallons.**

Period.		Malaya.	Ceylon.	Sumatra.
January	1924	325	70	83
	1923	18,467	2,085	74,567
February	1924	—	—	28,036
	1923	12,380	2,422	44,346
March	1924	527	15	—
	1923	14,112	266	97,466
April	1924	41,170	—	54,395
	1923	5,302	2,659	84,516
May	1924	115,170	—	—
	1923	4,419	3,129	151,551
June	1924	73,011	—	46
	1923	2,274	844	136,917
July	1924	129,188	50	152,698
	1923	4,747	1	219,545
August	1924	56,723	—	99,933
	1923	10,740	—	262,533
September	1924	56,976	—	69,619
	1923	287	7	220,460
October	1924	—	—	—
	1923	361	6	206,768
November	1924	—	—	—
	1923	20	12	—
December	1924	—	—	—
	1923	648	—	—
Total	1924	—	—	—
	1923	73,757	11,431	1,498,669
	1922	40,061(a)	1,977(b)	228,324

(a) Seven months only.

(b) Two months only.

TABLE 8.

REPORT OF INVENTORY—PRODUCTION—DOMESTIC SHIPMENTS OF PNEUMATIC CASINGS—INNER TUBES—SOLID TIRES, ETC., IN U.S.A. AND CANADA.

August, 1922, to and including August, 1924.

	Pneumatic Casings.				Inner Tubes.				Solid Tires.			
	No. Mfrs. Report- ing.	Inventory.	Production.	Shipments.	No. Mfrs. Report- ing.	Inventory.	Production.	Shipments.	No. Mfrs. Report- ing.	Inventory.	Production.	Ship- ments.
August, 1922	63	4,629,392	2,905,209	3,029,823	63	5,207,228	3,808,224	4,220,055	11	189,698	84,313	69,435
September, 1922	64	4,612,037	2,504,744	2,502,106	64	5,164,757	3,501,442	3,558,971	11	200,016	82,767	66,797
October, 1922	64	4,682,958	2,674,662	2,588,770	64	5,488,033	3,787,758	3,420,680	11	213,942	85,480	71,275
November, 1922	62	4,964,976	2,733,134	2,379,708	61	6,210,053	3,850,908	3,075,023	11	234,684	85,775	61,466
December, 1922	59	4,599,208	2,656,942	2,934,079	59	5,732,125	3,411,074	3,825,949	10	244,061	77,221	64,570
January, 1923	62	4,695,916	3,127,270	2,994,297	62	5,838,310	3,951,885	3,748,651	11	262,462	83,343	60,611
February, 1923	60	5,224,387	3,217,987	2,588,639	60	6,771,958	4,039,202	3,001,697	11	270,191	75,457	63,394
March, 1923	58	5,670,601	3,865,726	3,322,637	57	7,740,945	4,875,414	3,828,315	11	265,843	79,788	77,144
April, 1923	56	6,088,272	3,539,326	2,976,160	55	8,394,184	4,259,558	3,535,635	11	260,631	71,468	72,609
May, 1923	57	6,906,594	3,659,986	2,757,764	57	9,292,223	4,317,537	3,414,115	10	268,323	77,288	67,147
June, 1923	55	7,040,600	2,956,943	2,502,185	54	8,924,326	3,590,011	3,581,060	10	283,425	72,445	52,126
July, 1923	54	6,471,124	1,992,989	2,539,425	52	7,396,444	2,625,118	3,942,247	10	263,891	42,345	45,219
August, 1923	58	6,058,387	2,355,915	2,807,432	53	6,950,578	3,577,922	4,304,034	10	262,810	48,141	45,925
September, 1923	60	5,397,557	2,029,581	2,623,775	55	6,457,455	3,254,575	3,683,574	10	249,379	37,074	45,971
October, 1923	59	4,876,352	2,351,340	2,819,583	55	6,898,425	3,855,244	3,595,737	10	234,945	37,285	48,065
November, 1923	55	4,689,329	2,399,725	2,456,296	53	6,693,639	3,451,716	3,422,426	11	213,686	32,577	49,471
December, 1923	57	4,329,300	2,437,148	2,603,617	52	6,318,446	3,288,665	3,497,472	10	178,088	34,397	62,408
January, 1924	56	4,808,084	3,220,292	2,838,570	51	6,720,247	3,887,959	3,542,500	10	182,782	53,604	47,295
February, 1924	55	5,265,133	3,278,674	2,866,626	50	7,339,307	4,067,631	3,397,668	10	188,519	60,646	52,965
March, 1924	57	5,763,084	3,427,692	2,990,872	53	8,157,704	4,218,950	3,500,105	10	203,638	68,662	61,482
April, 1924	60	6,164,226	3,307,478	3,013,441	54	8,627,343	4,035,242	3,586,279	10	212,419	69,534	58,486
May, 1924	58	6,313,193	3,038,586	2,769,970	53	8,761,812	3,744,108	3,648,490	10	219,538	63,901	60,267
June, 1924	55	6,155,537	2,629,742	2,753,143	51	8,166,158	3,493,431	3,964,609	10	212,704	50,887	58,716
July, 1924	52	5,138,474	2,552,329	3,561,110	49	6,534,022	3,857,289	5,392,253	10	202,850	42,498	51,449
August, 1924	52	4,477,016	3,234,741	4,193,114	48	5,758,310	5,015,687	5,619,914	9	183,159	52,516	60,684

"Production" and "Shipments" figures cover the entire month for which each report is made. "Inventory" is reported as of the last day of each month.

"Inventory" includes tires and tubes consisting domestic stock in factory and in transit to, or at, warehouses, branches (if any) or in possession of dealers on consignment basis, and as a total represents all tires and tubes still owned by manufacturers as a domestic stock.

"Shipments" includes only stock forwarded to a purchaser and does not include stock forwarded to a warehouse, branch, or on a consignment basis, or abroad.

Compiled by the Rubber Association of America, Inc.

THE RUBBER ASSOCIATION OF AMERICA.

STATISTICS COMPILED FROM 1924 QUESTIONNAIRE—THIRD QUARTER, COVERING THE THIRD THREE MONTHS OF 1924.

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The number of rubber manufacturers reporting data was 216; the number of crude rubber importers and dealers reporting data was 37; the number of reclaimers (solely) reporting data was 7. The total daily average number of employees, on basis of third week of July, 1924, was 130,718.

Reclaimed Rubber:—	Inventory.	Production.	Shipments.
Reclaimers solely (7)	3,110	9,865	10,274
Manufacturers who also reclaim			
(19)	2,999	6,813	4,957
Other manufacturers (45)	1,511	—	—
Total	<u>7,620</u>	<u>16,678</u>	<u>15,231</u>
Scrap Rubber:—	Inventory.	Consumption.	Due on Contract.
Reclaimers solely (7)	29,621	12,697	8,828
Manufacturers who also reclaim			
(19)	6,488	9,801	6,091
Other manufacturers (23)	1,027	—	—
Total	<u>37,136</u>	<u>22,498</u>	<u>14,919</u>

NUMBER OF TONS OF CRUDE RUBBER CONSUMED IN THE MANUFACTURE OF RUBBER PRODUCTS AND TOTAL SALES VALUE OF SHIPMENTS OF

Product.	MANUFACTURED RUBBER PRODUCTS.	Total Sales Value
	Number of Tons Crude Rubber Used.	of Shipments of Manufactured Rubber Products
Tyres and Tyre Sundries:—		
Automobile and motor truck pneumatic casings	45,617	\$132,316,000
Automobile and motor truck pneumatic tubes	13,848	25,549,000
Motor cycle tyres (casings and tubes)	83	375,000
Bicycle tyres (single tubes, casings and tubes)	128	625,000
All other pneumatic casings and tubes, not elsewhere specified	14	104,000
Solid tyres for motor vehicles	3,913	7,457,000
All other solid tyres	75	126,000
Tyre sundries and repair materials	847	4,051,000
Total—Tyre and Tyre Sundries	<u>64,525</u>	<u>\$170,603,000</u>
Other Rubber Products:—		
Mechanical rubber goods	3,337	16,000,000
Boots and shoes	2,559	29,219,000
Insulated wire and insulating compounds	673	7,360,000
Druggists sundries, medical and surgical rubber goods	544	3,207,000
Waterproof cloth, clothing and rubber sheeting	710	4,890,000
Hard rubber goods	575	2,243,000
Heels and soles	1,317	5,229,000
Miscellaneous not included in any of above items	1,192	3,814,000
Total—Other Rubber Products	10,907	\$71,962,000
Grand Total—All Products	<u>75,432</u>	<u>\$242,565,000</u>

INVENTORY OF CRUDE RUBBER IN THE UNITED STATES AND AFLOAT FOR U.S. PORTS, SEPTEMBER 30th, 1924.

On hand:—	Plantation.	Long Tons. Para.	All Other.
Manufacturers	34,067	2,606	1,052
Importers and dealers	11,076	727	117
Total	<u>45,143</u>	<u>3,333</u>	<u>1,169</u>
Grand Total—On hand		49,645	
Afloat:—	Plantation.	Long Tons. Para.	All Other.
Manufacturers	14,064	289	
Importers and dealers	34,677	1,397	333
Total	<u>48,741</u>	<u>1,686</u>	<u>333</u>
Grand Total—Afloat		50,760	

PROPAGANDA NOTES.

The Crepe Rubber Sole.

Encouraging reports have been received from the Propaganda Secretary from America pointing to an increasing use of the Crepe Rubber Sole in that country. A comprehensive scheme for propaganda has been prepared which will carry the campaign on till the end of 1925.

In the September issue of the Bulletin particulars were given of the tests which had been carried out by policemen and postmen with regard to the Crepe Rubber Sole. The testimonials which were received were so eminently satisfactory that it was felt that every endeavour should be made to extend the use of crepe-soled footwear among this class of workers and among the working classes generally. Accordingly a special folder was prepared and the services of a canvasser obtained to visit all the police stations in the London area, and to get into touch with postal officials and railway and other workers. The Department also availed itself of the opportunity to extend the distribution of the folder beyond the London area by having it inserted in one of the issues of "The Police Review" and the police journal called "On and Off Duty." Similar arrangements have been made for the distribution of the folder through the "Post," which circulates among postal workers. Particularly valuable results are likely to accrue from this form of propaganda and already very satisfactory reports have been received from a firm retailing policemen's and postmen's boots as to the enquiries being received and boots sold. This firm is making a special feature of this type of footwear and has had the loan of the Rubber Growers' Association's Travelling Exhibit, together with samples of the actual boots which have been worn by policemen and postmen for over nine months, with practically little or no signs of wear.

One of the principal advantages of the Crepe Rubber Sole is the economy which it represents and for this reason alone it should make a strong appeal to the working classes. The scheme referred to above has been of a purely experimental nature, but so successful has it been that it is considered advisable to extend it to other centres, particularly in certain Continental countries, and the whole question will be raised with the Propaganda Committee of the International Association at The Hague, and also with the Association's Propaganda Representative in Belgium.

Cost of Crepe Sole Repairs.

The "Shoe Trade's Journal" of November 14th, contains a report of a very interesting discussion which took place at the monthly meeting of the London District Council of the Boot Trade's Association, with reference to the Crepe Rubber Sole, and particularly the cost of repairs with this soleing material. The Costing Committee on Repairs by Crepe Rubber submitted a report in which it was suggested that repairs with Crepe Rubber for ordinary footwear was not a lasting proposition, and that consequently it was not worth while getting out special prices. Repairers in the meantime, it was thought, would be quite safe in accepting at the

same price as for sewn repairs, the crepe costing about the same as decent bend soles, and the solution and sticking costs being about the same as for sewing the sole on. In regard to sports shoes, especially tennis, it was felt that the position was quite different. Crepe had shown great lasting properties and had undoubtedly come to stay for tennis and sports wear. The opinion has, in fact, been expressed that in a few years it would be universally adopted for that purpose, especially if improvements were carried out in one or two points. There were so many difficulties to face that the Committee thought that the time had not yet come when one could lay down scientific costing on this question. First of all the Trade Board had not yet fixed any charges for this work and it was not for the L.D.C. Costing Committee to do that. In fact, they could not do it, they had got to wait for the Trade Board wages before they knew what men would be required for the job. Most men were putting it into the hands of day workers and they knew pretty well what it costs, but until the crepe piece wages were put forward by the Trade Board it was impossible to say anything about wages costs. No two people agreed upon the price of doing a crepe job, there being great varieties in sports goods and consequently great varieties in the work itself. The best way was to stitch on first a light runner and then stick the permanent sole on that. Some stuck on the welt, but the other way, while a little more expensive, made the best job. The Committee felt it could not recommend any prices with regard to the public until they got some surer ground to work upon, they could only suggest that those who were doing tennis soles were charging 8s. 9d. for gent's three-eighths edge, and 6s. 9d. ladies' quarter-inch edge; while if a lighter substance were used for gent's, about 1s. reduction was made in that price. This was what those people were doing. Where the heels were fixed another 1s. 6d. was charged. They did not want to build heels on tennis shoes, but they were required on some other sports shoes.

Commenting on the Committee's suggestions, particularly in regard to the same price being charged for walking shoes as for ordinary sewn repairs, a member raised the question of an extra percentage for crepe. He pointed out, that where you had got a good gritty road you could not touch it for hard wear, especially for the kiddies if it was put on properly. In his particular district, he pointed out, a man would wear through a stout ordinary leather sole in a month, whereas he could get from nine to ten months' wear from the crepe sole of equal substance. It was therefore suggested that the repairer should get an extra percentage profit because he only got the job from six to twelve months instead of once a month. This particular repairer charges 8s. 9d. for one-quarter inch and one-eighth inch on the fore parts, and three-eighth inch on heel. Where it was a converted golf shoe, the corrugated leather sole throughout with three-eighth inch edge at least, and perhaps half-inch built heel, he thought 13s. to 14s. was not too much.

Complaints have frequently been received by the Propaganda Department in regard to the high prices charged for repairs with Crepe Rubber, and it is therefore very satisfactory to obtain con-

firmation from a Boot Trade's Association that Crepe Rubber does not cost more than decent bend soles and that solution and sticking costs are about the same as for sewing on a leather sole. The argument that an extra charge should be made for Crepe Rubber repairs on the ground of its greater durability is no doubt very sound from the point of view of the boot repairer, but it is hardly likely to appeal to the members of the general public who have discovered in the Crepe Rubber Sole a material that would assist in the reduction of repair bills.

Christmas Presents Scheme.

The distribution of the manufacturers' circulars, together with a covering letter from the Rubber Growers' Association, has now been completed. It is early yet to give a detailed report as to the results obtained, but from information already received from different quarters it would appear that the scheme is bearing excellent fruit.

British Empire Exhibition.

At the close of the Exhibition the various exhibits which were loaned to the Association were returned to the manufacturers, through whose co-operation it was possible to collect a very comprehensive range of Rubber manufactured goods, which included most of the more important uses to which Rubber has been put.* In the event of the Exhibition continuing and the Malaya Pavilion being open next year, it has been suggested that the Association should again lend its support by arranging an Exhibit.

In connection with the propaganda activities of the Association the need has long been felt of the possession of a permanent comprehensive exhibit of Rubber-manufactured goods, and it has therefore now been decided to assemble such an exhibit at the Association's offices. The necessary arrangements are accordingly being made, and show cases, etc., have already been installed. It is intended to arrange the exhibit under the following heads in order to demonstrate the important part which Rubber plays in every department of life: (1) Rubber as an aid to the communication of ideas; (2) Rubber as an aid to transportation; (3) Rubber in control and transmission of power and light; (4) mechanical Rubber goods; (5) fighting fire with Rubber; (6) waterproof clothing and footwear; (7) Rubber in the service of health; (8) Rubber in the home; (9) toys and sports. It is hoped that the exhibit under each of these heads will be as comprehensive and representative as possible and letters have already been addressed to all those manufacturers who co-operated in the collection of goods for the British Empire Exhibition, inviting them to send samples of goods manufactured by them.

Cellular Rubber.

In its issue of the 22nd November, the "Chemical Age" discusses the question of Cellular Rubber as an insulator. "There is not much question," it writes, "about the fact that were it possible to effect substantial improvements in existing methods of heat insulation, very considerable savings might annually be effected in coal and other fuels.

* The thanks of the Association are due to these manufacturers for their very valuable support.

"The problem, of course, presents itself from two angles, namely, in the conservation of heat within the walls of certain industrial plant such as furnaces, retort benches, etc., and in the retention of cold in such cases where low temperatures are produced artificially, as in systems of cold storage. So far as requirements and the efficacy of various insulating methods falling under the first category are concerned there still seems to be a good deal of difference of opinion; and, if we recollect rightly, it was Dr. J. W. Mellor who, in speaking of the use of porous materials such as diatomaceous earths, contended that there may be a reversal in conductivity at about 1,000° C. in the sense that the more porous bricks become better conductors than the same bricks of less porosity. Looking at the other side of the question, however, we can now turn to the admirable report which has lately been issued by the Food Investigation Board, and which contains an account of the experiments, carried out with an exceptional regard for accuracy, by Dr. Ezer Griffiths. It is not necessary to review the work which has been continued with the more or less accepted materials, but attention is particularly attracted by experiments which have been conducted with a novelty among insulators, namely, cellular rubber. This is a material in which rubber is expanded by gas under pressure, the process resulting in a mass consisting of a number of self-contained cells, each of which is bounded by thin rubber walls. It is not, therefore, a sponge in which passages merely pass from end to end, and some idea of the difference may be gained from the fact that while ordinary rubber sponge has a density of 14 lb. per cubic foot, the density of the cellular material may be so low as 3.7 lb. A number of experiments conducted with the material in order to determine its abilities as an insulator seem to place it in a very advantageous position as compared with, for instance, granulated cork, the most remarkable fact being the saving in insulating effect per pound of material used. It can be quite understood, however, that those responsible for the report are not at this stage likely to be so imprudent as to express hopes which it may not be possible to substantiate. Albeit, it is to be trusted that when data from long-period tests are available they may permit of a more precise statement, for the whole problem of insulation is one the importance of which in certain branches of industry we cannot afford to overlook."

Rubber Coats for Fruit.

An announcement of considerable interest to West Indian fruit growers was made at the recent Pan-Pacific Food Conference, held in Hawaii, at which the West India Committee was represented by Mr. Robert Catton. Another of the delegates, Dr. P. J. S. Cramer, of Java, claimed to have discovered a method of shipping tropical fruits to markets in temperate zones without special provision for cold storage. The method adopted was simply to dip the fruit in rubber latex, allow the rubber film to harden, and then to ship the fruit as ordinary freight.

Dr. Cramer has forwarded fresh strawberries treated in this way, the fruit holding its flavour, form, aroma and practically the same stage of ripeness, from ten to fourteen days. He has also shipped

latex-dipped ripe mangoes and the mangosteen, which is considered the most delicate of all tropical fruits, from Buitenzorg, in Java, to Paris, where their arrival was proclaimed in perfect condition.

In the course of his experiments, this scientist took green bananas and dipped half their length in the rubber latex, whereupon the untreated half of the fruit ripened, while the remainder continued in its green state. The theory underlying the new method is that the ripening of fruits is an oxidation process, depending on free absorption of oxygen and the exhalation of carbon-dioxide. The rubber latex coagulates into an air-tight envelope, which checks both processes. It also prevents the growth of mould spores and the bacteria of fermentation, so that the ripening fruit is held, as it were, in a trance, without any change whatever.

It is claimed that the thin film of rubber on the surface of the fresh fruit strips off as easily as a glove from the fingers, allowing the normal ripening to be resumed.

SPOTTED CREPE RUBBER.

In connection with investigatory work on spotted crepe rubber carried out by the Imperial College of Science and Technology, South Kensington, interim reports were published in the *BULLETIN* for September, 1923, p. 507, and May, 1924, p. 315. Arrangements were made to supply the Imperial College of Science with further samples of spotted rubber received from the Association's Scientific Staff in Malaya together with samples of unspotted rubber, in order that the investigations could be continued.

Through the courtesy of Professor J. B. Farmer, the following report by Professor W. Brown, who undertook the further investigation, is published for the information of members :—

REPORT ON EXPERIMENTS DEALING WITH SPOTTING IN CREPE RUBBER.

The material for this investigation consisted of the following :—

Sheet A, a small sheet abundantly dotted with orange, yellow, and violet spots, the former preponderating and in some parts of the sheet coalescing to form large yellow patches.

Sheet B, a roll of crêpe about 1 yard long. In this the ground-work was a light yellow (the original colour of the rubber?). Spotting here took the form of rusty patches and black spots, the former being diffuse, the latter more localised. The percentage of the sheet which was discoloured distinctly increased towards the centre of the roll.

Sheet C, a roll of crêpe about 3 yards long, the chief feature of which was profuse black spotting, chiefly towards the centre of the roll. There were in addition occasional orange, yellow, violet, and red spots, and also one or two large patches of a light yellow. A noteworthy feature of this sheet was that in the interior of the roll the uncoloured portions had a white milky appearance as distinguished from the translucent appearance shown by normal crêpe.

Sheets D, E and F, labelled respectively "Sagga," "Inch Kenneth," and "Chempong." These were packets of unspotted rubber.

Microscopical Examination of the Spots.

In order to prepare pieces of spotted rubber for microscopic examination, the following procedure was adopted after various trials:—

A small piece of spotted crêpe was put on a slide, a drop of benzene added to it, and after a few minutes, when the rubber was distinctly swollen, a thick cover-slip put on top and squeezed down. The thin film of swollen rubber was found to be sufficiently transparent for microscopic study. No difficulty was experienced in demonstrating that fungal mycelium was present in the rubber. This applied to all the different coloured spots tested, but the presence of mycelium was most clearly shown in the case of the dark spots which were the predominant feature of *Sheet C*. The ease with which the mycelium in the dark spots can be seen is undoubtedly due to the fact that the mycelium itself is dark coloured, whereas in the case of the yellow and violet spots, the colouring substance is an excretion from the hyphae which in themselves are hyaline. It may be added that on several occasions undoubted mycelium was observed under the microscope in unspotted portions of the rubber. As will be mentioned below, colour producing fungi have been isolated from unspotted pieces of rubber as well as from the spotted portions.

Certain preliminary observations were made which have a bearing on this subject.

The behaviour of pieces of the various sheets was tested as regards solubility in benzene. The most striking result met with was that the rubber of *Sheet C*, which had a milky appearance, produced a turbid solution suggesting the presence of water in the sheet. Estimation of the water content of this sheet gave 2 per cent. When a portion of this sheet was dried over calcium chloride the milky appearance was much reduced and the sheet as now dried gave a much clearer solution in benzene. It seemed clear that this sheet had been incompletely dried and the fact that the spotting was most marked towards the centre of the roll, as mentioned above, seems obviously related to this fact.

In attempting to isolate the fungi responsible for the spottings it seemed advisable in the first instance to see whether, given suitable moisture conditions, the spots would spread. For this purpose the limits of the discolorations in pieces of spotted rubber were marked with Indian ink, and the rubber was then placed in a thin layer of water in Petri dishes at 25°C. The first result of soaking the sheets out in water was apparently to diminish the size of the spots, and in the case of the smaller ones to cause them to disappear altogether, but on subsequently drying the sheets, the spots reappeared as before, showing that the effect just mentioned was due to the reduced translucency of the sheets incidental to the uptake of water.

In the first experiment of this type carried out it was found on drying out the sheets after a fortnight's soaking in water that none of the spots had increased in size with the exception of the violet ones characteristic of *Sheet A*. These had definitely extended beyond the original limits and one or two new ones had appeared.

A further detailed test of the type above described was carried out. From the 28th May to the 18th June duplicate pieces of *A*, *B* and *C* (with the limits of the spots marked) and of *D*, *E* and *F* (unspotted) were placed in water in Petri dishes at 25°C., and after a lapse of three weeks they were dried off and the condition as regards spotting noted. The results were as follows:—

Sheet A.—Yellow spots have not spread; violet spots definitely increased in size; two large new dark violet spots have appeared; also one small green spot.

Sheet B.—No change in either piece.

Sheet C.—Piece I.: A diffuse yellow patch has appeared, otherwise no change. Piece II.: Black spots have not spread; some brick-red spots have appeared; also a considerable amount of general yellow colour over most of the sheet.

Sheet D.—In one piece a few diffuse yellow spots have appeared; in the other, nothing.

Sheet E.—Nothing in either case.

Sheet F.—In one piece about eight small rusty spots have appeared; in the other, nothing.

These experiments showed that, when wetted, the rubber, both spotted and unspotted, was capable of further spotting, though the fact that many of the spots would not spread indicated that the fungus in such cases was either dead, or that it was unable to advance through the rubber in the present condition of the latter, or that the conditions determining colour formation in some cases no longer remained. The problem now was to see what fungi could be isolated from the discoloured spots. For this purpose small pieces of the crêpe, cut through the centre of a spot, were put out on plates of sterile potato agar. In some cases the surface of the rubber was subjected to a sterilising process, in others not. To sterilise the surface of the pieces of rubber, they were dipped for a minute in absolute alcohol, the adhering air bubbles squeezed out, and the pieces then transferred to mercuric chloride solution (1 in 1,000) for 3-5 minutes, then washed in several changes of sterile distilled water. The plates on which unsterilised pieces were placed were invariably swamped with bacteria, whereas the sterilised pieces on similar treatment remained, in general, bacterium-free. It was safe to assume, therefore, that the process of sterilisation, having killed the bacteria on the surface, would be sufficient to kill any fungal spores lying there, so that any fungal colonies arising from the rubber on the potato medium must have developed from spores or mycelium present within the tissue of the rubber.

A considerable number of platings-out of spotted and unspotted pieces (with surface sterilised) was carried out and from these cultures about twelve distinct organisms were isolated. These were mainly species of *Penicillium*, *Aspergillus*, *Fusarium*, *Cladosporium*, etc.—i.e., the common moulds. Some of these were only occasionally met with, others more frequently. On trying these out on sterilised crêpe in the manner to be described below, it was found that some of them produced no spotting under conditions in which others did, so that further work was restricted to a few species, of which the following are the three most important:—

(1) *A Penicillium* which on media rich in sugar, e.g., potato

glucose agar (glucose 4 per cent.) gives the blue-green fructification typical of *Penicillium glaucum*, but on potato agar itself is characterised by the violet colour of its spores. This fungus appeared from time to time both in yellow and rusty spots. On potato glucose agar this fungus produced a yellow coloration; on potato mush agar a pink coloration.

(ii) A *Penicillium* which on a large variety of media produced a characteristic diffuse yellow coloration. This *Penicillium* was isolated repeatedly. It turned up nearly always in the yellow diffuse spottings present on *Sheet A*, but was also from time to time found in spots of all colours and occasionally met with in platings of unspotted crêpe.

(iii) A *Fusarium* with a definite *Cephalosporium* stage, which in practically all cases appeared in platings of the violet spots of *Sheet A*, and only rarely elsewhere. This fungus is, to all appearances, the same as one isolated by Horne from Hevea bark and provisionally named by him *Fusarium versicolor*. The association of this fungus with the violet spottings or flushes was the most definite result obtained in these isolations. The colour reactions of this fungus have proved to be very various and interesting.

In order to test the capacity of these organisms to produce spotting the following procedure was adopted:—

Short strips of crêpe were sterilised by being placed in a plugged boiling tube with several c.c.s of 40 per cent. formaldehyde. After overnight treatment in this way, the strips were washed in repeated changes of sterile distilled water over a period of several days. They were then placed, with aseptic precautions, into sterile test-tubes containing about 1 c.c. of a medium at the bottom. This medium was either pure water or a dilute nutrient solution, either with or without agar. The strips of sterilised rubber were dropped on or dipped into the medium at the bottom of the tubes. The purpose of this medium was partly to keep the strip of rubber moist and partly to give the fungus a start. Inoculations with the various fungi were made just where the strip rested on or dipped into the medium. A number of tubes were in all experiments left uninoculated as controls, in order to test the effectiveness of the sterilisation process and of the various precautions adopted against accidental contamination from the air. In no case has any fungus developed in the control tubes, and no trace of discoloration has appeared on any of the control strips.

The following is a résumé of attempts to produce spotting by the various fungi isolated.

Experiment I.

The media at the bottom of the test-tubes were:—

1. Distilled water.
2. Plain agar (1.5 per cent., no nutrient added).
3. A synthetic medium (plus agar) having the following composition:—

Glucose	*2%.
Asparagin	*2%.
K PO ₄	*1%.
MgSO ₄	*0.75%

4. The same as No. 3, plus 1 per cent. glucose.

Unspotted portions of *Sheet C* and portions of *Sheet D* were tested. Nine fungal strains were employed, and of these two produced no discoloration even after two months' growth. The remaining seven definitely produced discoloration in that time. Five of the strains produced definite discoloration after a fortnight. The following is an account of the effects by strains I, II and III of pages 684-685:—

STRAIN I.

On Media 1 and 2.—No change.

On Medium 3.—General, but not strong, rusting over whole of the strips.

On Medium 4.—Ditto, together with pink discoloration at base of strips.

STRAIN II.

On Medium 1.—No change.

On Medium 2.—Slight yellow flush.

On Medium 3.—Strong yellow flush over almost the whole strip.

On Medium 4.—Similar to last, but stronger.

STRAIN III.

On Medium 1.—Considerable area of strip coloured violet.

On Medium 2.—Violet flush at base of strips.

On Medium 3.—Discoloration more rusty than violet, and covering most of the rubber.

On Medium 4.—Similar to last.

The discolorations produced by the other fungi took the form of rusty or pink spottings or flushes. In no case was there any black spotting. *Sheet D* (an unspotted sheet) behaved similarly to *Sheet C*, showing that there was nothing in the chemical composition of the former which precluded it from spotting. Portions of *Sheet D* were accordingly used henceforth in these experiments.

Experiment II.

Technique as before; fungi, the two species of *Penicillium* and the *Fusarium* described on pages 684-685. Three media were used, one of them being Medium 3 of Experiment I, the other two being modifications of the same, the asparagin being replaced in one case by an equal weight of potassium nitrate, in the other by an equal weight of ammonium chloride. The idea here was to see whether, by varying the source of nitrogen available to the fungus and thereby changing the reaction of the medium in contact with the rubber strips, the colour effects could be varied.

The result of this experiment was to show that more rapid discoloration of the rubber strips took place over the ammonium chloride medium than in the case of the other two.

Experiment III.

This was designed on the results of the preceding experiment. Ammonium acetate was tested as source of nitrogen against ammonium chloride.

Four media were tested, all having the same composition as regards mineral salts (K_2PO_4 , '1%; $MgSO_4$, '075%).

The media were :—

A.—Am. acetate, .2 per cent.; glucose, .2 per cent.

B.—Am. acetate, .2 per cent.; glucose, 2 per cent.

C.—Am. chloride, .2 per cent.; glucose, .2 per cent.

D.—Am. chloride, .2 per cent.; glucose, 2 per cent.

The colour effects produced by Fungi I, II and III after 17 days at 25° were as follows :—

FUNGUS I.

Medium A.—Violet spotting in all the strips

Medium B.—Rusty spotting in all the strips.

Medium C.—Like A.

Medium D.—Like B.

FUNGUS II.

Yellow flushes produced in all; strongest in D, then in C, least in A and B.

FUNGUS III.

Medium A.—Diffuse weak violet coloration covering nearly the whole of the strips.

Medium B.—Intense red coloration over lower part of the strips.

Medium C.—Relatively slight rusty to violet coloration near base of strips.

Medium D.—Similar to C, but less intense.

This represents the stage at which the investigation has arrived. It is clear that the colorations produced by any one fungus are markedly affected both in quantity and quality by the medium in which the fungus is started. This is in accordance with what is known in connection with fungal colorations and with the writer's own experience on this point. It is particularly interesting that the presence of ammonium acetate (from which free acetic acid is liberated by the metabolism of the fungus) appears to influence very strongly the kind of colour effects produced. The behaviour of the *Fusarium* (Fungus III) above noted is very striking in this respect. One is led from this to think that the presence of acetic acid in the coagulated latex may play a part in any subsequent spotting, and, more generally, that the organic acid content of coagulated latex would repay study in this connection. Experiments are under way to test the effect of various organic acids in regard to the development of spotting.

General Discussion.

The work so far carried out here completely confirms, except in certain unimportant matters of detail,* the conclusions of Sharples (*Bulletin of the Department of Agriculture, F.M.S., No. 19, 1914*). Several fungi have been isolated from discoloured spots, and by means of these definite spotting has been produced under carefully

* The violet coloration produced by the *Fusarium* is, according to Sharples, due to the spore masses. In the writer's experience this is not so; the colour is due to a pigment excreted by the fungus.

controlled artificial conditions. The conclusion is particularly strong in the case of the violet spots produced by the *Fusarium*. It has been shown that these spots will spread when the rubber is kept wet, that the *Fusarium* can be repeatedly isolated from these violet spots, and that identical spotting can be produced by a pure culture of the fungus. In the case of the other fungi, the association of a particular fungus with a particular kind of spot is not so clear, though there is little doubt that the yellow pigment-producing *Penicillium* is responsible for the diffuse yellow flushes on crêpe.

The case of the black spots which are the main feature of *Sheet C* is noteworthy. In these, microscopic demonstration of the presence of mycelium is very easy, on account of the dark colour of the latter, so that the presence of a fungus is quite certain. At the same time none of these spots were found to spread when the rubber was kept wet, nor was any fungus isolated from them capable of producing the black spotting under the conditions tried. It would seem that this dark coloured fungus is no longer alive. Sharples, working presumably with much fresher material than was available here, found the same result. It might be suggested that the conditions prevailing in the drying house are fatal to this fungus.

Probably a large number of common moulds will produce discolorations in rubber under suitable conditions, though the three species mentioned on pages 684-685 occur most frequently in the case of the samples examined here.

That these fungi produce the discolorations is not controverted by the fact that they can be seen and also isolated from clean rubber. Without doubt they are abundantly present in all samples; whether or not they produce any colour will depend on how they are allowed to grow, and probably in particular on how much growth they make before the rubber is washed and their main source of food removed.

It is probable that the spottings produced artificially in the laboratory here have developed more slowly than is the case in the factory. This might be expected, as it is impossible now to bring the rubber back by mere soaking to the same degree of hydration as it was in before it was dried off in the first instance.

The fact that the uninoculated controls have, in the present investigation, invariably remained unspotted is evidence against any mere chemical discoloration of the wet rubber, and indicates that micro-organisms are the causative agents. That these agents are chiefly fungi admits of little doubt. Bacteria have occasionally appeared in the isolations carried out in this work, but in view of their comparative infrequency, and of the evidence presented on this point in an earlier report (Dr. Paine), they have been discarded as of little importance.

The directions in which the further investigation of spotting can be profitably carried on in this laboratory have already been indicated—*viz.*, a further study of the effects of small quantities of organic acids in influencing colour production.

W. BROWN.

EDITORIAL NOTES.

Rubber Association of America.

The statistics compiled from the 1924 Questionnaire—third quarter—are published in this issue. The Rubber Association states that, as with previous reports, it is estimated that the crude rubber consumption figures are 90 per cent. of the total, and the crude rubber inventory figures 95 per cent. of the total for the entire industry.

Freight Rates on Rubber.

Cable advice has been received from the R.G.A. Local Secretary, Kuala Lumpur, that the rate of freight on rubber to London has been increased to 64s. This is an advance of 5s. per ton over the previous rate. The Association has also been informed that the Colombo rate will be increased by 5s. per ton as from the 16th December.

The revised rates will therefore be:—

Colombo to London and Liverpool	
(from 16th Dec.)	 62s. 6d. per ton.
Straits to Liverpool (from 3rd Nov.)	62s. 6d. per ton.
Straits to London (from 3rd Nov.)	64s. 0d. per ton.

Institution of the Rubber Industry.

At the Annual Meeting of the Institution of the Rubber Industry held on 3rd November, 1924, Sir Stanley Bois was elected President of the Institution for the ensuing year.

“Rubber Producing Companies.”

We have received from the Mincing Lane Tea and Rubber Share Brokers' Association, Limited, a copy of the well-known Handbook for 1924. The book contains very full information relating to rubber producing companies, including Tea-cum-Rubber Companies, together with a list of Directors and Secretaries. The book is invaluable as a handy reference, and should be in the possession of all those who require detailed information relating to the various Rubber companies.

Taxation in the Netherlands Indies.

(*vide* August BULLETIN, page 479).

According to a report published in the Dutch Press, the taxation proposals introduced by the Colonial Minister at The Hague provide for the levying upon companies in the N.E.I. of a proportional profits tax. The tax proposed for 1925 is 10 per cent. as recommended by the Bruins Committee, with an “opcenten” of 25 per cent. on the 10 per cent., making $12\frac{1}{2}$ per cent. in all. As stated previously, this profits tax will supersede the existing system of taxes for companies in the N.E.I. The new taxation proposals will have to be approved by the Second Chamber in Holland,

in which event they will be incorporated in a separate Ordinance. The Indian Budget proposals also include an export duty on native rubber which is estimated to produce 500,000 guilders for 1925.

Poplar Hospital for Accidents.

The Council at their meeting on 3rd November agreed that the facilities at the disposal of the Association should be utilised in circulating an appeal from Sir C. C. McLeod on behalf of the Poplar Hospital for Accidents. Certain rubber companies already contribute towards the funds of this Hospital, and it is hoped that the appeal will meet with sympathetic consideration from non-subscribers. The following is the appeal issued by Sir C. C. McLeod :—

The Poplar Hospital for Accidents is holding its Annual Festival at the Savoy Hotel on the 17th December next, and I have been asked to take the Chair on that occasion. I gladly acceded to the request;

- (a) because of the splendid work which this Hospital does in dealing with the many accidents which occur daily to men who are employed in connection with the vast tonnage of ships and goods entering the Port, and also to children in the thickly populated districts which abound the Docks;
- (b) because of the efficient and economical administration of the Hospital;
- (c) because, being in the heart of Dockland, it meets a vital necessity;
- (d) because as a Trader in the Port of London I feel it incumbent upon me to support the Hospital.

The ever increasing trade of London has brought a corresponding increase in the number of accidents to the Dockers and Seamen of the Port, and, owing to the total inadequacy of the present 70 year old Hospital, a reconstruction and extension scheme has to be undertaken. This scheme is costing £65,000, of which £48,000 has been collected.

A special effort is being made this year to collect the balance of £17,000, plus £20,000 for annual maintenance, or a total of £37,000.

May I beg of you to send me a generous donation to enable the Hospital to carry on its great work.

Cheques made payable to the "Secretary, Poplar Hospital for Accidents," should be sent to me at the Office of the Port of London Authority.

Patents.

The following notifications have appeared in the respective Government *Gazettes* :—

"Straits Settlements Government Gazette."

No. 1774 (3rd October, 1924).—Montague Kelway Bamber, The Laboratory, Hyde Park Corner, Colombo, Ceylon.

"A process for the manufacture of crude dipentene

from crude rubber and for the recovery of liquid rubber." (Authority to file specification and exemplification of Letters Patent granted to Mr. Bamber in Ceylon.)

No. 1867 (17th October, 1924).—Tan Kah Kee, 1, River Valley Road, Singapore. "An improved and simplified method of manufacturing inner tubes of pneumatic tyres of every description direct from latex." (Patent granted.)

No. 1911 (24th October, 1924).—Tan Kah Kee, 1, River Valley Road, Singapore. "An improved method of manufacturing rubber soles and heels for all descriptions of footwear." (Patent granted.)

"Federated Malay States Government Gazette."

No. 6567 (3rd October, 1924).—Jack Sheridan Cowper, 24, Queensberry Place, South Kensington, London, S.W.7. "Improved blocks, slabs or the like for paving or other purposes and method of manufacture and apparatus therefor." (Complete specification accepted.)

SCIENTIFIC RESEARCH NOTES.

Sole Crepe.

On 29th September, 1924, at the Research Laboratory of the Association on Pataling Estate, Pataling, Selangor, a Lecture on the subject of Sole Crepe Rubber was delivered by Mr. H. C. Pinching, A.R.C.Sc., Senior Scientific Officer, and afterwards a demonstration of sole crepe manufacture was given in the Pataling Estate Factory. Between two hundred and two hundred and fifty planters, merchants and others were present. A report of the Lecture and discussion has been printed for distribution to Estates.

Rust on Sheet Rubber.

Mr. Pinching reports that the possibility of "rust" developing on sheet rubber after smoking when stored has been raised by an estate manager. Is it possible that when properly smoked sheet rubber is kept under damp conditions, such as might occur when a consignment was subjected to rain in transit or when stored in a damp place or kept in cases made of unseasoned timber, that the micro-organisms causing "rust" could develop on the surfaces which are in contact with air? Mr. Pinching noticed on several occasions and for several years that samples of smoked sheet rubber left lying about in an office become apparently "rusty" in time. Particularly has he noticed it in connection with samples of sheet in certain visiting agents' and estate agents' offices. These sheets in question had been selected by the V.A. or Manager as being first-class and were used often as object lessons to managers of other estates. He has found that these sheets often lose their pristine, bright appearance, and become dull and show signs of "rustiness" on stretching. He brought this matter to the notice of Dr. Stevens

some three or four years ago, but as far as he remembers, no satisfactory conclusion was arrived at as to the cause of this apparent deterioration of the rubber on keeping or the apparent generation of "rust" when smoked sheet is kept.

Microscopic examination of a piece of smoked sheet which has been lying about the laboratory for about nine months gave interesting results. The sheet when received was of a pleasing, bright appearance and free from "rust." Now the surface is covered with dirt and is dull. On wiping the surface with a cloth to remove superficial dirt and then stretching the rubber a slight "rustiness," or at least appearance of "rustiness" becomes apparent. A thin section taken from the surface of the sheet was examined microscopically and while a tremendous amount of dirt was still present in or on the rubber, the yeast-like fungi which helps to cause the ordinary "rustiness" of smoked sheet was also present. He does not claim that this proves conclusively that "rust" has developed on the surface of the smoked sheet after the sheet was received. The first examination for "rust," made by Mr. Edwardes when the rubber was received, may have been made and was probably merely cursory. It will be obvious that as "rust" may develop on one square inch of the surface of a sheet and be absent from all the remaining surface it is a difficult matter to guarantee that rust is absent from a sheet merely by testing one or two places by stretching. Still, this case in point seems to contribute some evidence towards the matter of the possibility of "rust" forming on sheet after smoking.

Experiments are in hand to see whether "rusts" will develop on smoked sheet when kept under suitable conditions.

Hevea Seeds for Burma.

The effects of pod disease of Hevea, due to *Phytophthora meadii*, in Lower Burma results in a shortage of healthy, well-developed seeds for propagation purposes and further, the annual epidemic of Abnormal Leaf fall (also due to *Phytophthora meadii*) which affects the trees is liable to reduce the vitality of the trees, so that, generally speaking, there is a possibility of their offspring becoming weaker and less able to withstand attacks by fungal diseases. In view of these matters Mr. Pinching suggested, when he was in Lower Burma last year, that it would be worth while trying to import seeds from Malaya for further planting-up purposes. Several estates acted upon his advice, but unfortunately for some unknown reason the percentage germination from the imported seeds was extremely low. He took every precaution to see that the seeds were freshly gathered, were despatched at once and were not delayed in transit. He has received another request this year from a Lower Burma Estate for seeds and he has suggested, after explaining the misfortunes of last year, that it would be better to send a trial case of seeds first, and that if they give a satisfactory percentage germination, he will, upon the receipt of a cable, despatch further quantities. He would like to express that while he is only too pleased to assist subscribing estates in this matter, and that while he takes every precaution to see that the matter is properly dealt with as far as lies in his power, yet he can offer no guarantee that the percentage

of germination will be satisfactory. So many things, beyond his power to avoid, could happen to the consignment in transit.

Life of Rubber Trees in Malaya. (*vide* June BULLETIN, p. 344.)

Mr. Pinching has forwarded a report entitled, "A consideration of the state of the oldest existing *Hevea* trees in Malaya and its use as a means of assessing the possible longevity of *Hevea* under plantation conditions." In this report he refers to the paper he submitted to the Rubber Conference at the Sixth International Exhibition of Rubber and other Tropical Products, held at Brussels in 1924 (see Official Report, pp. 166 *et seq.*), and deals with a careful inspection of the oldest *Hevea* trees growing in Malaya. Unfortunately, very accurate records of the earliest plantings of *Hevea* in Malaya, and of the method of dealing with those trees are not available. Mr. Pinching visited and examined the old trees now existing in Singapore, Botanical Gardens, Kuala Kangsar, Kamuning Estate, Sungei Siput and Linsum Estate belonging to the Anglo-Malay Company. His reports deals with this inspection and contains photographs of some of the old trees examined. Unfortunately, for purposes of comparison, where old trees have existed in Malaya, drastic thinning out, in which all badly gnarled and useless trees have been removed, has been done during the last few years, and hence we cannot get in full the real effects of age, unfavourable environmental conditions and drastic tapping in many instances. It is unfortunate that more precise information is not available as to natural span of life of the rubber tree, and until such information is forthcoming, it is advisable to use as a working basis for revenue-bearing purposes the figure suggested by Mr. Morgan in the "India Rubber Journal," *viz.*, 40-45 years for the life of the rubber tree under ordinary plantation conditions.

Note.—Mr. Pinching's report can be inspected by any member on application at the offices of the Association.

Budgrafting.

The following are extracts from reports prepared by the Mycologists :—

Sungei Way Estate.—The work of bud-grafting on Sungei Way Estate was commenced in December, 1923, and continued until the end of June, 1924. Buds were used from 26 selected trees from the experimental area on Pataling Estate (Field 49). The greater portion of these mother trees were excellent or very good yielders, but in a few cases mother trees were chosen from other considerations apart from the yield, *e.g.*, A 87 was chosen because of its extra large girth and large number of latex vessel rows—the yield was not very good, and C 52 was chosen as an extremely poor yielder with very few latex vessel rows, etc. Full data of all trees made use of has been tabulated and it will be interesting to compare yields, girth, latex vessel rows, etc., in the grafts with the known data from the mother trees at some future date.

Altogether some 3,815 plants were budded, of which 2,765 were successful = 72 per cent. successes. Considering that the work was continued through the wintering season, this result must be considered

quite good. To date (August, 1924), 1,222 of the budded stock have definitely taken and the new shoots are making good progress.

Every budded plant was labelled with a waterproof label giving number of mother tree and date of budding, and later date of shooting. In addition, a complete record was kept and made up each day. Finally, each row was marked by a permanent label giving mother tree number, date of budding, date of opening; pruning, etc.

At one period, during February, ringing was adopted instead of pruning as a possible method of hastening the shooting of the buds, but as the results were disappointing, this method was dropped and the pruning resumed.

It is intended to plant out the grafts on a prepared area on Pilmoor Estate as soon as ready, treating them as ordinary stumps.

Plants budded from one mother tree will be planted in rows of about 25 and a permanent label affixed to each in addition to labelling the separate rows. We hope to commence this work towards the end of the year.

Kombok Estate.—Mr. Elvin proceeded to Kombok Estate, Sungei Gadut, on July 1st and commenced work instructing the coolies on the 2nd. The first day was taken up in collecting all the necessary materials and completing preparations. On the 2nd two coolies were allotted to him and each day two additional coolies, until 10 coolies were working. Several days were then taken up in teaching the coolies in detail how to perform the operation. During the period July 1st to August 16th, the work was carried on, 3,318 stumps were budded in the nursery and an additional 2,432 in the field. All these were about 8-9 months old. The budding material was obtained from field 13, the trees forming a three-acre block which had been untapped previously to the proof-tapping for selection of mother trees.

Of 3,318 bud-grafts opened before Mr. Elvin returned to the office, 1,754, or 53 per cent. had taken, and in 25 cases the shoot was coming away. Rain fell only on three days during this period.

Bukit Panjong Estates.—Mr. Sithambaram was lent to Bukit Panjong Estate from the 24th July to August 7th, a total of 15 days. During that period he superintended the budding of 2,426 plants, 657 of these being in the field and the remainder in the nursery. He could only see the opening up of the first three days' buddings, a total of 434, and of these 309 were successful in the initial stage, *i.e.*, the buds had taken. This represents 71 per cent. successes, which, considering the extraordinary dry weather must be considered highly satisfactory. Instructions have been given to water freely in the late afternoon so long as the dry spell continues. A letter of appreciation of Mr. Sithambaram's work in instructing the coolies and in controlling the labour under him has been received from the Manager of Bukit Panjong Estate.

Sandycroft Estate.—Mr. Sithambaram proceeded to Sandycroft Estate, Taiping, on the 8th September, and returned to the office on the 29th September.

Coolies on the estate were instructed in bud-grafting and some four thousand bud-grafts made in the nursery and a small number in the field—a six acre block. The number of successes to date is

considerably smaller than is usual. This may be due in part to the very heavy rain during the period combined with in some cases inefficient wrappings by the coolies employed.

The manager of the estate expressed satisfaction with the work of Mr. Sithambaram in training the coolies.

Marasmius sp. (*vide* September BULLETIN, p. 555).

Mr. Sanderson reports that a good deal of progress has been made with pure cultures of a *Marasmius sp.*, which, under certain conditions attacks the tapped surface and has sometimes been mistaken for "Mouldy Rot." The fruit of this has been matured and pure cultures started from spores. These will be used for experimental inoculations most probably during October if facilities can be obtained. Previous inoculations gave negative results due to dry weather. So far inoculations in agar have behaved somewhat curiously and it appears that even under laboratory conditions the moisture content of the surrounding air is a controlling factor to some extent. A comparatively dry atmosphere to a large extent inhibits the growth of the mycelium even when food material is present in easily available form.

A second species is also being investigated. This is a very slow growing species under all the conditions so far tested.

"Rubber Oil" as a fungicide and germicide.

With a view to finding out if "rubber oil" would be of any value on estates to take the place of the many well-advertised disinfectants, which are used in estate routine in connection with wounds and disease prevention, some tests were made to determine this point.

The oil is of a dark brown colour and has a penetrating disagreeable smell. It is neutral to litmus and is inflammable. It does not mix with water nor with alcohol, but mixes readily with xylol, forming a brown solution. The xylol oil mixture does not separate out on standing.

As the oil is not miscible with water a two per cent. soap solution was used to form an emulsion in order to obtain low percentages of the oil in culture media.

The emulsion formed with soap on standing quickly separates into soap solution and oil.

The tests were made in a similar manner to those given in the "Second Malayan Report for 1920," but the fungus used in this case was a pure culture of a *Marasmius sp.*

Mr. Sutcliffe concludes by stating that the efficiency of "Rubber Oil" as a disinfectant is very low and that there are probably better and cheaper fungicidal preparations already on the market.

Field Experiments Nos. 1 & 2.

(*vide* September BULLETIN, pp. 552-4).

The Mycologists have forwarded further reports on these experiments with plans of each of the areas, showing the positions in each case of the poor and good yielders. The reports include a short summary of results dealing with yields and girth measurements at 20 inches, the yields being measured volumetrically as latex.

The whole of the figures show very conclusively that one must look in general to the big trees, *i.e.*, to the trees of rapid growth for the high yielders, and the yield per *unit* length of cut indicates that the high yield is not due solely to the increased length of cut on the big trees as compared to the smaller trees. It must not be assumed, however, that all big-girth trees are necessarily high yielders. There are other factors which have some influence on yields, but apart from the small percentage of exceptions, the figures quoted suggest that girth (*i.e.*, the most obvious indication of rate of growth) is one of the most important factors influencing yield.

Note.—The reports and diagrams can be inspected by any member interested on application at the Association's Offices.

Packing of Rubber.

The following letter was received from a Rubber Manufacturer and forwarded to the Scientific Staff for comment :—

re RUBBER PACKING CASES.

"I was recently talking to a Case-maker who explained that the trouble with a lot of cases is caused by people putting too many nails in.

"I have been examining some rubber boxes and find they are crammed with nails, highly polished ones, with the result that there is nothing to grip the wood. It seems to me that if rough nails were used, and fewer of them, the boxes would not so easily come undone. This is a point which I think might be brought before the R.G.A. by our Committee."

Mr. Pinching reports as follows :—

"The copy of the letter from the Rubber manufacturer to the Home Committee with reference to the use of highly polished nails in making up momi cases for packing rubber has been read with interest and I am in agreement with the writer that were rough or unfinished nails employed in fastening the cases together, fewer than are now used would be required to obtain the same holding strength. I have on many occasions pulled a momi case to pieces, before the box strapping has been fixed merely with the hands, the highly polished nails slipping with ease out of the wood. A kind of "barbed" nail might be more effective than the present smooth wire nails employed in holding the cases together.

"The simple method of putting the nails into salt and water before using would prevent any slipping when driven into the wood."

RESEARCH WORK OF THE ASSOCIATION.

REPORT BY THE CONSULTING CHEMIST IN LONDON.

Formic Acid as a Coagulant.

Many years ago formic acid was tried as a coagulant for latex and found to work satisfactorily. The amount required was less than the corresponding weight of acetic, calculated on the 100 per cent. basis. The merchants offering formic acid were sanguine that this would be available at a price which would make it more economical to use than acetic. It does not appear, however, that formic acid was ever marketed at a competitive price. It has certainly never been used to a large extent as a coagulant. Subsequently the war intervened and nothing further was heard of the matter. More recently formic acid has been offered again as a latex coagulant and tests have been made to compare its coagulative power with that of acetic acid. These tests showed that the increasing efficiency claimed for formic acid could not be altogether substantiated. One firm claimed an efficiency ratio of 2:1 or more, stating that "one pound of 90 per cent. formic acid coagulates as much rubber latex as two pounds of the glacial acetic acid used at present." Glacial acetic acid is almost 100 per cent. The formic acid offered was 75 per cent. One part of acid was mixed with 120 parts of water. One gallon of this solution was used for each 20 gallons of standardised latex so that actually one part of formic acid reckoned as 100 per cent. strength was found sufficient for approximately 1,800 parts of latex. This corresponds to one part of glacial acetic acid to 1,200 parts of latex, so that the relative efficiencies are as 3 to 2. Incidentally tests have been made in Ceylon and Mr. O'Brien finds the relative efficiencies to be 4 to 3 which is therefore less favourable than the Pataling figures and still further removed from the efficiency ratio of over 2 to 1 claimed by the formic acid makers.

The samples of smoked sheet rubber coagulated with the proportions of acids given above, that is 1:1,800 for the formic acid and 1:1,200 for the acetic were mixed with sulphur in the usual 9/1 proportion and vulcanised 2 hours at 40 lbs. with the following results:—

	Acetic acid.	Formic acid.
Breaking load—grms. per sq. mm.	1,630	1,600
Final length—per cent.	983	985
Elongation at a load of 130 kilos. per sq. cm.	815	825

These results show that the formic acid coagulated rubber vulcanises slightly more slowly than the acetic acid coagulated rubber, but in other respects no appreciable difference is revealed. These samples were open-steam cured. A preliminary test with mould-cured specimens gave similar results; these specimens were not fully cured:—

	Acetic acid.	Formic acid.
Breaking load—grms. per sq. mm.	1,370	1,320
Final length	984	990
Elongation at a load of 130 kilos. per sq. cm.	840	865

The figures indicate the same small difference in rate of cure as found with the steam-cured specimens above and it was not thought necessary to make repeat vulcanisation tests.

It would seem, therefore, that apart from a slight retardation in rate of cure, there is no marked difference in the vulcanising properties of rubber coagulated with formic acid in the above proportions in the place of acetic acid. On the other hand there appears to be a slight disadvantage, namely, retardation in rate of cure which would no doubt be more pronounced if by any chance an excess of the acid were employed. A bulk test should be made on an estate to see whether the proportion of formic acid used in the preparation of the sample tested is sufficient for ordinary factory working. It will then be possible to ascertain with certainty whether the retardation in rate of cure resulting from use of formic acid as a coagulant is of practical importance.

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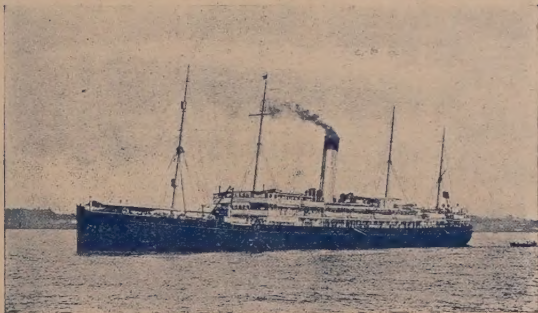
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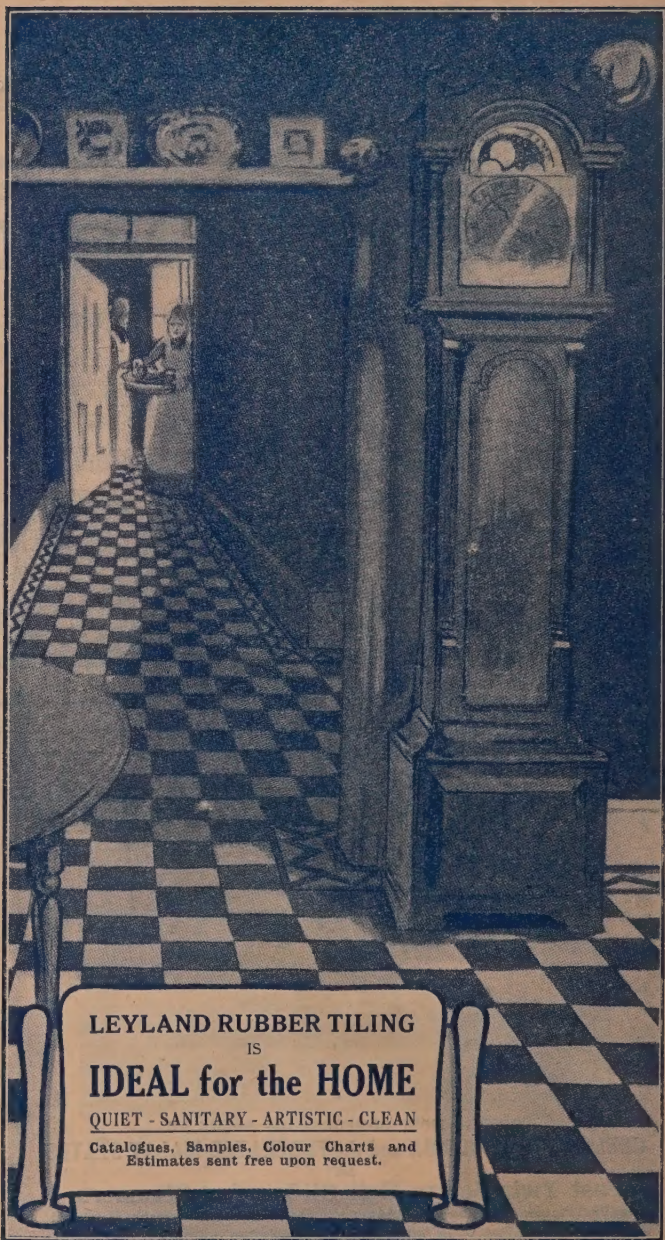
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